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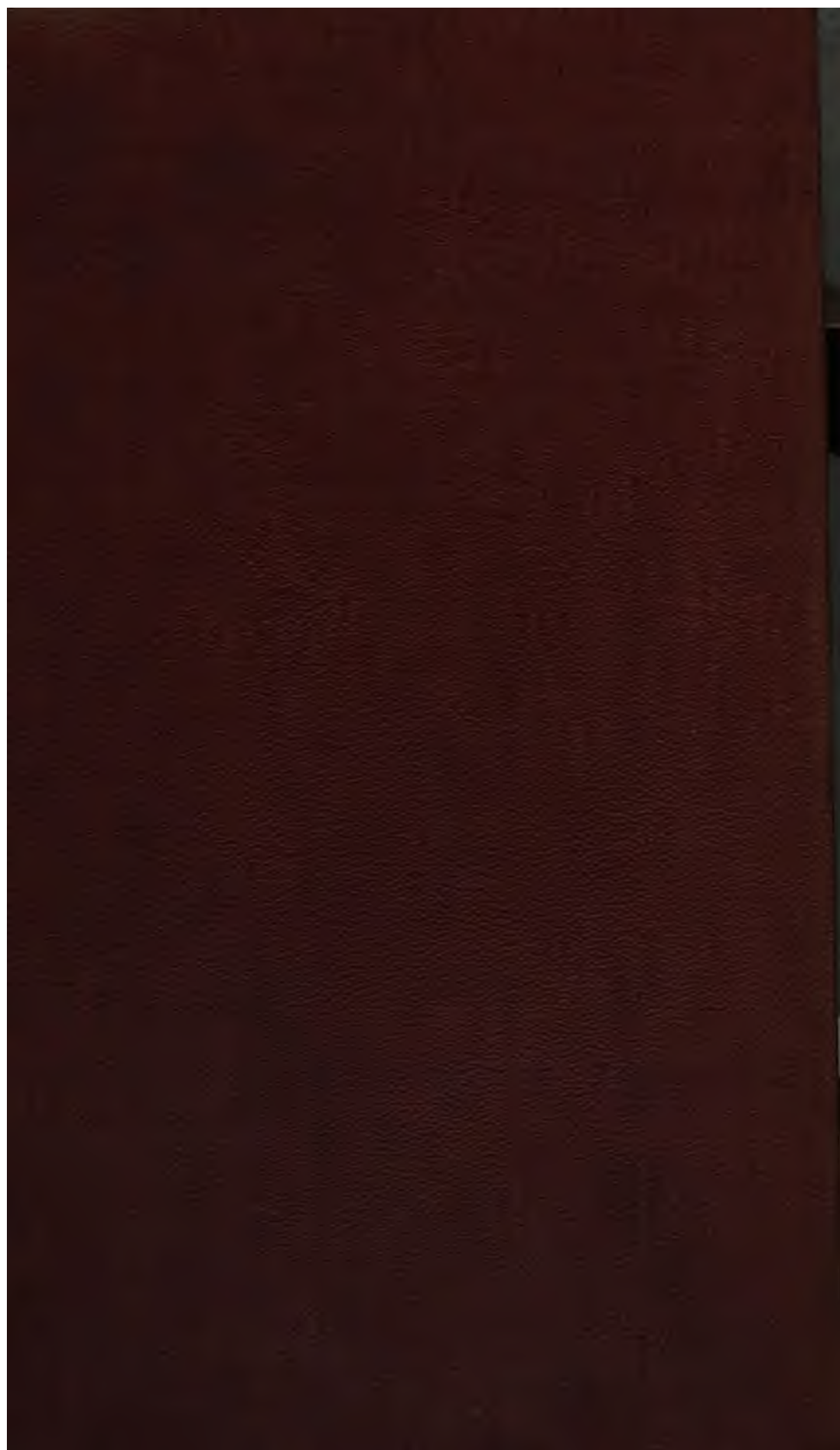
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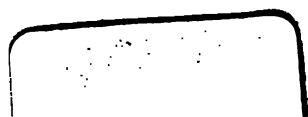




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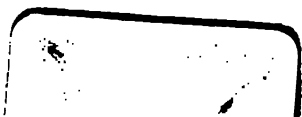




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**TIDE TABLES**

FOR THE

**BRITISH AND IRISH PORTS,**

FOR THE YEAR

**1863 ;**

**ALSO THE TIMES AND HEIGHTS OF HIGH WATER AT FULL AND CHANGE  
FOR THE PRINCIPAL PLACES ON THE GLOBE.**

**COMPUTED BY JOHN BURDWOOD, MASTER, R.N.**

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**PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.**  
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***Price One Shilling and Sixpence.***

**1862.**



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THURSO - - - - - "	5	13	21	29	37	45	53	61	69	77	85	93
WATERFORD - - - - "	9	17	25	33	41	49	57	65	73	81	89	97
WESTON-SUPER-MARE	7	15	23	31	39	47	55	63	71	79	87	95

## NOTICE.

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If it be desired to reduce the Mean Time at any Place to that of Greenwich (or Railway) Time, (which latter is used in the Tide Tables, published in Liverpool and Glasgow,) the following correction must be applied to the Time given in these Tables :—

	Minutes.
Brest - - -	+ 18
Devonport - -	+ 17
Portsmouth - -	+ 4
Dover - - -	- 5
Sheerness - -	- 3
Harwich - - -	- 5
Hull - - -	+ 1
Sunderland - -	+ 5
North Shields - -	+ 6
Leith - - -	+ 13
Thurso - - -	+ 14
Greenock - - -	+ 19
Liverpool - -	+ 12
Pembroke - - -	+ 20
Weston-super-mare - -	+ 12
Holyhead - - -	+ 18

For the Irish Ports, should Dublin Mean Time be required, the following correction must be applied to the time given in these Tables :—

	Minutes.
Kingstown - - -	- 1
Belfast - - -	- 2
Londonderry - -	+ 4
Sligo - - -	+ 9
Galway - - -	+ 11
Queenstown (Cork) - -	+ 8
Waterford - - -	+ 3

The above corrections are also given at the foot of each page under the place for which the times and heights of high water are predicted.



## ADVERTISEMENT.

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IN the following Tables the time of High Water is given to *Mean* time at Place. Those who are desirous of knowing the *Apparent* time, (or that shown by the Sun,) at which High Water occurs, must apply the equation of time, by addition or subtraction, as directed for that purpose.

The height of the tide in these Tables is calculated from the mean level of the low water of ordinary springs, because the soundings expressed in most charts are reduced to that level. The height therefore which is given at each place is the actual rise of high water above the mean low-water level of spring-tides.

In the column of the Moon's transit, (m) stands for morning, and (a) for afternoon.

The Moon's age is given in days, and tenths of a day, from the time of her conjunction, or change; thus, it is New Moon on the 17th of May, at 4 h. 48 m. in the afternoon, and therefore, on the 18th of May, at noon, the moon being 19h. 12 m. old, her age may be accounted as eight tenths of a day, and is expressed by 0.8.

The highest equinoctial tides take place, on the west coast of Ireland and on the south coast of England, three transits after the New and Full Moon, unless diverted by gales of wind or other extraordinary causes. Along the east coast of England, they take place four transits after the New and Full Moon. In the river Thames they occur five transits after the same epoch. These differences arise from the cause, that the same tide-wave which produces high water on the west coast of Ireland takes half a day in its progress from thence to the east coast of England, and a whole day before it arrives in the river Thames.

The time of high water at Brest is added for the benefit of vessels navigating the north coast of France and the adjacent sea.

Immediately after the Tide Tables, at page 98, will be found a convenient method of deducing, from them, the height of the tide at any intermediate hour, between high and low water.

The next Table, at page 101, shows the depths on the dock-sills at Falmouth, Devonport, Plymouth, Portsmouth, Sheerness, Chatham, Woolwich, Deptford, London, Hull, Middlesbrough, Hartlepool, Sunderland, Leith, Pembroke, Liverpool, Birkenhead, Dublin, and Londonderry.

In page 103 will be found a collection of Constant Differences, by which the time and height of high water at certain other ports may be approximately found. If the authorities at the different ports would transmit to the Admiralty six months' observations (at least) of the times and heights of high and low water, these Constants might be usefully increased.

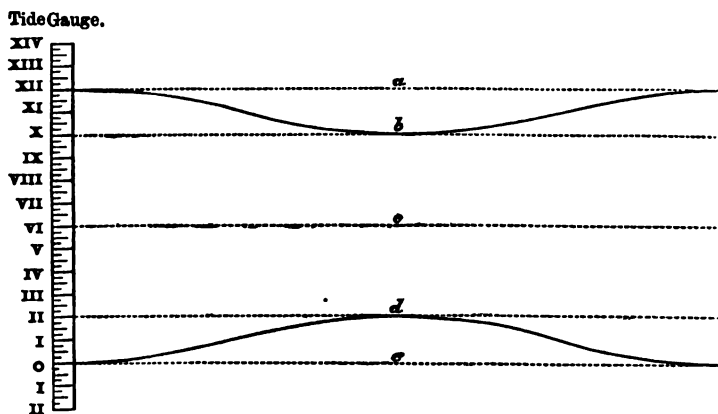
In page 108 a description is given of the general set of the tides in the neighbourhood of several parts of the coast, including a full account of the streams among the Orkneys, and through the Pentland Firth, by Com. F. W. L. Thomas, R. N. And, the development, by Rear-Admiral F. W. Beechey, of the movement of the great tide-wave up the English and Irish Channels, and into the North Sea; to which has been added a description of the set of the tides in the vicinity of Rathlin Island on the north coast of Ireland by Richard Hoskyn, Master, R. N.

Lastly, there is appended the time of high water on the days of Full and Change at various places on the globe arranged according to the apparent progress of the tide-wave, and also alphabetically; with the rise of the tide at springs and neaps.

The stations at the several ports where the tidal observations were made on which the predictions in these tables are based, are as follows,—viz :—

Brest, entrance of the basin—Devonport, Dockyard—Portsmouth, Dockyard—Dover, North Pier—Sheerness, Dockyard—London Docks (reduced to London Bridge the latter being given in these tables, by applying to the times at the docks  $+10^m$  and to the heights  $-\frac{1}{4}^{in}$ )—Harwich, Angel Quay—Hull, Victoria Dock—Sunderland North Dock—North Shields, Low Lighthouse—Leith, East Pier—Thurso, near Scrabster Pier—Greenock, East Dock—Liverpool, St. Georges Pier—Pembroke Dockyard—Weston-super-mare, Bairnbach Island—Holyhead, Pier—Kingstown Watering Pier—Belfast, New Dock—Londonderry, Ship Bridge—Sligo Bay, Mullaghmore—Galway, Nimmos Pier—Queenstown, Scott's Wharf—Waterford, Dublin cannon Fort.

The following diagram is intended to explain the terms Spring Rise, Neap Rise and Neap Range as made use of on the Admiralty Charts and in the Sailing Directions published by the Admiralty :—



- $a$  = Mean Level of High Water Ordinary Springs.  
 $b$  = " " " Neaps.  
 $c$  = Half Tide or Mean Level of the sea both at Springs and Neaps.  
 $d$  = Mean Level of Low Water Ordinary Neaps.  
 $e$  = " " " Springs.

*Example.*

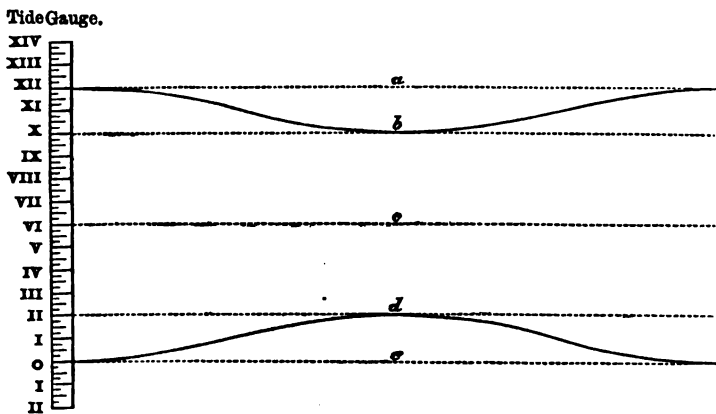
	ft.
Spring Rise (or Mean Spring Range) = $e$ to $a$	= 12
Neap Rise - - - = $e$ to $b$	= 10
Neap Range - - - = $d$ to $b$	= 8

**TIDE TABLES**  
**FOR THE**  
**BRITISH AND IRISH PORTS**  
**FOR THE YEAR**  
**1863.**

The stations at the several ports where the tidal observations were made on which the predictions in these tables are based, are as follows,—viz :—

Brest, entrance of the basin—Devonport, Dockyard—Portsmouth, Dockyard—Dover, North Pier—Sheerness, Dockyard—London Docks (reduced to London Bridge, the latter being given in these tables, by applying to the times at the docks  $+10^m$  and to the heights  $-4^{ins}$ )—Harwich, Angel Quay—Hull, Victoria Dock—Sunderland, North Dock—North Shields, Low Lighthouse—Leith, East Pier—Thurso, near Scrabster Pier—Greenock, East Dock—Liverpool, St. Georges Pier—Pembroke, Dockyard—Weston-super-mare, Bairnbach Island—Holyhead, Pier—Kingstown, Watering Pier—Belfast, New Dock—Londonderry, Ship Bridge—Sligo Bay, Mullaghmore—Galway, Nimmos Pier—Queenstown, Scott's Wharf—Waterford, Duncannon Fort.

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 $d$  = Mean Level of Low Water Ordinary Neaps.  
 $e$  = " " " " Springs.

*Example.*

		ft.
Spring Rise (or Mean Spring Range)	$= e$ to $a$	$= 12$
Neap Rise	$= e$ to $b$	$= 10$
Neap Range	$= d$ to $b$	$= 8$

**TIDE TABLES**  
**FOR THE**  
**BRITISH AND IRISH PORTS**  
**FOR THE YEAR**  
**1863.**



## TIDE TABLES FOR THE

JANUARY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.				DEVONPORT.				PORTSMOUTH.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
Th.	1	9a32	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.
F.	2	10 20	0 58 14 1	1 26 14 5	2 23 12 6	2 54 12 8	8 48 10 4	9 17 10 7						
S.	3	11 9	1 52 14 11	2 16 15 4	3 25 13 1	3 52 13 1	9 44 10 9	10 10 10 11						
	4	11 57	2 36 15 9	2 55 16 2	4 18 13 9	4 41 13 6	10 30 11 1	10 51 11 3						
S.	4	11 57	3 13 16 7	3 33 16 11	5 3 14 3	5 22 13 10	11 9 11 5	11 29 11 7						
M.	5	morn.	3 50 17 2	4 7 17 4	5 41 14 8	5 59 14 0	11 46 11 8	—						
Tu.	6	0 44	4 25 17 6	4 43 17 8	6 16 14 11	6 35 14 2	0 3 11 9	0 22 11 10						
W.	7	1 30	4 58 17 9	5 13 17 10	6 52 15 1	7 6 14 3	0 40 11 11	0 57 11 11						
Th.	8	2 14	5 30 17 9	5 46 17 9	7 21 15 0	7 38 14 1	1 13 12 0	1 31 12 0						
F.	9	2 58	6 4 17 8	6 22 17 6	7 53 14 9	8 11 13 10	1 48 12 0	2 5 11 11						
S.	10	3 41	6 41 17 3	6 59 16 11	8 28 14 3	8 45 13 7	2 23 11 11	2 42 11 10						
S.	11	4 25	7 18 16 5	7 39 16 2	9 0 13 10	9 18 13 4	3 0 11 8	3 19 11 6						
M.	12	5 12	8 0 15 8	8 24 15 3	9 40 13 5	10 2 12 11	3 39 11 4	3 58 11 2						
Tu.	13	6 0	8 50 14 9	9 19 14 6	10 27 12 11	10 55 12 8	4 21 11 0	4 46 10 9						
W.	14	6 53	9 52 14 5	10 32 14 4	11 25 12 7	—	5 14 10 6	5 45 10 4						
Th.	15	7 50	11 15 14 6	11 59 14 10	0 1 12 7	0 42 12 7	6 23 10 4	7 4 10 4						
F.	16	8 50	—	0 39 15 4	1 22 12 11	2 5 13 0	7 46 10 7	8 28 10 11						
S.	17	9 54	1 15 16 0	1 47 16 10	2 44 13 9	3 24 13 9	9 6 11 4	9 39 11 9						
S.	18	10 57	2 17 17 9	2 43 18 7	3 58 14 8	4 30 14 8	10 12 12 2	10 39 12 6						
M.	19	11 58	3 9 19 5	3 35 19 10	5 0 15 8	5 28 15 4	11 5 12 10	11 31 13 0						
Tu.	20	0a56	4 0 20 2	4 24 20 6	5 54 16 3	6 21 15 8	11 55 13 2	—						
W.	21	1 50	4 46 20 7	5 8 20 6	6 45 16 8	7 7 15 11	0 20 13 4	0 44 13 4						
Th.	22	2 41	5 29 20 4	5 50 20 4	7 28 16 7	7 49 15 8	1 7 13 4	1 29 13 3						
F.	23	3 30	6 10 19 8	6 30 19 2	8 10 16 1	8 29 15 3	1 51 13 2	2 11 13 0						
S.	24	4 18	6 51 18 5	7 11 17 9	8 48 15 5	9 4 14 7	2 31 12 9	2 51 12 5						
S.	25	5 4	7 32 16 11	7 53 16 1	9 19 14 5	9 38 13 9	3 11 12 1	3 31 11 9						
M.	26	5 51	8 13 15 3	8 36 14 6	9 58 13 4	10 16 12 10	3 51 11 4	4 11 11 0						
Tu.	27	6 39	9 1 13 10	9 31 13 3	10 39 12 5	11 4 12 1	4 33 10 7	4 57 10 2						
W.	28	7 27	10 8 12 11	10 50 12 8	11 32 11 8	—	5 25 9 10	6 1 9 7						
Th.	29	8 16	11 33 12 8	—	0 7 11 8	0 45 11 4	6 40 9 5	7 22 9 6						
F.	30	9 5	0 16 12 10	0 53 13 2	1 24 11 11	2 3 11 7	8 3 9 7	8 42 9 10						
S.	31	9 53	1 27 13 9	1 55 14 3	2 41 12 5	3 18 12 3	9 18 10 2	9 47 10 6						
Half Mean Spring } Range.			9ft. 6in.				7ft. 9in.				6ft. 4in.			

## Phases of the Moon.

## Moon's Declination at Noon.

	D.	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
Full - - - -	5	3	32	Morning.	1	21	N.45	9	4	N. 7	17	22	S.25	25	12	N. 7
Last Quarter -	13	0	6	Morning.	2	22	39	10	0	S.41	18	20	42	26	15	58
New - - - -	19	4	2	Afternoon.	3	22	33	11	5	34	19	17	30	27	19	1
First Quarter -	26	4	54	Afternoon.	4	21	26	12	10	18	20	13	11	28	21	11
					5	19	23	13	14	40	21	8	8	29	22	23
In Apogee - -	3	2	0	Afternoon.	6	16	29	14	18	23	22	2	46	30	22	35
In Perigee - -	18	5	0	Afternoon.	7	12	52	15	21	7	23	2	N.34	31	21	46
In Apogee - -	30	12	0	Midnight.	8	8	42	16	22	33	24	7	36			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4 m.

## JANUARY, 1863.

WEEK DAY.	MONTH DAY.	DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	
Th.	1	8 13 14 10	8 42 15 2	10 2 13 5	10 34 13 7	11 28 15 10	0 30 16 2	12 3						11'3
F.	2	9 7 15 6	9 33 15 9	11 1 13 10	11 26 14 0	0 2 16 0	0 30 16 2	12 3						12'3
S.	3	9 54 16 1	10 15 16 4	11 49 14 3	—	—	0 55 16 5	1 18 16 8	13'3					13'3
Th.	4	10 35 16 7	10 56 16 10	0 7 14 5	0 27 14 7	1 40 16 11	1 58 17 2	14'3						14'3
M.	5	11 16 17 1	11 36 17 3	0 45 14 9	1 5 14 11	2 17 17 5	2 35 17 8	15'3						15'3
Tu.	6	11 55 17 5	—	1 22 15 1	1 39 15 2	2 52 17 10	3 9 18 0	16'3						16'3
W.	7	0 14 17 6	0 31 17 8	1 57 15 3	2 14 15 4	3 25 18 2	3 42 18 4	17'3						17'3
Th.	8	0 48 17 9	1 7 17 9	2 29 15 4	2 44 15 4	3 59 18 5	4 16 18 5	18'3						18'3
F.	9	1 26 17 9	1 45 17 8	3 1 15 4	3 17 15 3	4 33 18 5	4 48 18 5	19'3						19'3
S.	10	2 3 17 7	2 22 17 6	3 34 15 2	3 52 15 1	5 5 18 4	5 23 18 3	20'3						20'3
Th.	11	2 42 17 3	3 1 17 0	4 11 14 11	4 30 14 9	5 41 18 1	5 58 17 11	21'3						21'3
M.	12	3 20 16 8	3 39 16 4	4 49 14 6	5 9 14 4	6 17 17 9	6 39 17 6	22'3						22'3
Tu.	13	4 2 16 0	4 26 15 7	5 32 14 1	5 57 13 10	7 1 17 3	7 24 16 11	23'3						23'3
W.	14	4 52 15 3	5 20 15 0	6 25 13 7	6 58 13 5	7 53 16 9	8 25 16 6	24'3						24'3
Th.	15	5 54 14 11	6 31 15 0	7 33 13 5	8 14 13 5	9 2 16 4	9 41 16 3	25'3						25'3
F.	16	7 12 15 5	7 54 15 11	8 56 13 7	9 37 13 11	10 22 16 4	11 4 16 6	26'3						26'3
S.	17	8 31 16 5	9 3 17 1	10 16 14 4	10 50 14 8	11 43 16 9	—	27'3						27'3
Th.	18	9 35 17 8	10 4 18 3	11 21 15 2	11 50 15 7	0 18 17 2	0 50 17 8	28'3						28'3
M.	19	10 32 18 10	11 0 19 3	—	0 16 16 0	1 19 18 2	1 47 18 8	29'3						29'3
Tu.	20	11 27 19 6	11 53 19 9	0 42 16 4	1 7 16 7	2 13 19 2	2 38 19 6	30'8						30'8
W.	21	—	0 18 19 11	1 31 16 9	1 55 16 11	3 1 19 9	3 25 20 0	31'8						31'8
Th.	22	0 42 19 11	1 5 19 10	2 17 16 11	2 39 16 10	3 48 20 1	4 8 20 1	32'8						32'8
F.	23	1 28 19 7	1 50 19 4	2 59 16 9	3 20 16 7	4 30 20 0	4 52 19 10	33'8						33'8
S.	24	2 11 18 11	2 33 18 5	3 40 16 4	4 0 16 0	5 12 19 7	5 31 19 3	34'8						34'8
Th.	25	2 53 17 11	3 13 17 3	4 21 15 7	4 41 15 2	5 51 18 10	6 11 18 5	35'8						35'8
M.	26	3 32 16 8	3 52 16 0	5 2 14 9	5 23 14 3	6 32 18 0	6 54 17 5	36'8						36'8
Tu.	27	4 13 15 5	4 35 14 9	5 45 13 10	6 10 13 6	7 15 16 11	7 39 16 6	37'8						37'8
W.	28	5 2 14 2	5 34 13 9	6 38 13 1	7 11 12 9	8 8 16 1	8 40 15 8	38'8						38'8
Th.	29	6 9 13 6	6 48 13 7	7 49 12 7	8 31 12 6	9 17 15 5	9 57 15 2	39'8						39'8
F.	30	7 29 13 9	8 8 14 1	9 13 12 8	9 54 12 10	10 37 15 2	11 19 15 3	40'8						40'8
S.	31	8 43 14 7	9 10 15 0	10 30 13 1	11 2 13 5	11 58 15 5	—	41'8						41'8
Half Mean Spring Range.		9ft. 4in.				8ft. 0in.				9ft. 7in.				
Equation of Time at Noon.														
M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.			
1	3 45		9	7 19		17	10 19		25	12 35				
2	4 13		10	7 44		18	10 39		26	12 48				
3	4 41		11	8 8		19	10 58		27	13 1				
4	5 9		12	8 31		20	11 16		28	13 12				
5	5 36		13	8 54		21	11 33		29	13 23				
6	6 2		14	9 16		22	11 50		30	13 33				
7	6 28		15	9 38		23	12 6		31	13 43				
8	6 54		16	9 59		24	12 21							

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 8 m.      SHEERNESS subtract 8 m.      LONDON 0 m.

## TIDE TABLES FOR THE

JANUARY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.												
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.								
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.											
Th.	1	9a32	9	9	9	11	9	41	10	0	3	30	16	9	4	3	17	1	0	22	11	2	0	53	11	5					
F.	2	10 20	10	9	10	2	10	36	10	4	4	30	17	5	4	55	17	9	1	20	11	8	1	45	11	11					
S.	3	11 9	11	0	10	5	11	20	10	7	5	17	18	1	5	36	18	4	2	11	12	2	2	32	12	4					
S.	4	11 57	11	41	10	9	11	59	10	10	5	56	18	6	6	15	18	9	2	53	12	6	3	11	12	9					
M.	5	morn.	—	—	—	—	0	19	10	11	6	35	19	0	6	53	19	2	3	29	12	11	3	46	13	1					
Tu.	6	0 44	0	36	10	11	0	52	11	0	7	11	19	4	7	29	19	6	4	3	13	3	4	19	13	5					
W.	7	1 30	1	10	11	0	1	28	11	0	7	47	19	7	8	3	19	9	4	37	13	6	4	52	13	7					
Th.	8	2 14	1	44	11	0	1	59	11	0	8	17	19	10	8	35	19	9	5	8	13	7	5	25	13	6					
F.	9	2 58	2	17	10	11	2	34	10	11	8	51	19	8	9	10	19	7	5	42	13	5	6	1	13	3					
S.	10	3 41	2	52	10	10	3	10	10	9	9	28	19	4	9	47	19	1	6	19	13	2	6	39	13	0					
S.	11	4 25	3	29	10	8	3	47	10	7	10	5	18	10	10	24	18	7	7	0	12	9	7	20	12	7					
M.	12	5 12	4	5	10	6	4	25	10	4	10	45	18	3	11	9	17	11	7	41	12	4	8	4	12	2					
Tu.	13	6 0	4	45	10	3	5	10	10	1	11	38	17	7	—	—	—	—	8	29	11	11	8	57	11	8					
W.	14	6 53	5	36	10	0	6	5	9	11	0	10	17	3	0	42	16	11	9	29	11	6	10	3	11	5					
Th.	15	7 50	6	39	9	11	7	22	9	11	1	15	16	10	1	51	16	10	10	42	11	4	11	22	11	6					
F.	16	8 50	8	4	10	1	8	44	10	3	2	29	17	1	3	6	17	6	11	59	11	9	—	—	—	—					
S.	17	9 54	9	23	10	6	9	58	10	9	3	44	18	2	4	19	18	10	0	35	12	2	1	9	12	8					
S.	18	10 57	10	31	11	1	11	1	11	4	4	50	19	6	5	18	20	1	1	41	13	2	2	13	13	7					
M.	19	11 58	11	29	11	7	11	55	11	10	5	45	20	8	6	11	21	2	2	41	14	0	3	7	14	5					
Tu.	20	0a56	—	—	—	—	0	20	12	0	6	38	21	6	7	3	21	10	3	31	14	9	3	55	15	0					
W.	21	1 50	0	44	12	1	1	8	12	1	7	27	22	1	7	51	22	2	4	18	15	3	4	40	15	4					
Th.	22	2 41	1	32	12	1	1	54	12	0	8	13	22	2	8	34	22	0	5	2	15	4	5	23	15	2					
F.	23	3 30	2	15	11	11	2	37	11	9	8	55	21	9	9	15	21	4	5	45	14	10	6	6	14	6					
S.	24	4 18	2	58	11	7	3	18	11	5	9	36	20	9	9	57	20	2	6	27	14	2	6	49	13	8					
S.	25	5 4	3	38	11	2	3	58	10	11	10	17	19	7	10	38	18	11	7	11	13	3	7	34	12	10					
M.	26	5 51	4	18	10	8	4	38	10	4	11	0	18	3	11	25	17	7	7	55	12	4	8	18	11	10					
Tu.	27	6 39	4	59	10	1	5	22	9	10	11	52	17	0	—	—	—	—	8	42	11	6	9	9	11	1					
W.	28	7 27	5	47	9	8	6	17	9	6	0	23	16	4	0	55	15	10	9	42	10	8	10	20	10	5					
Th.	29	8 16	6	56	9	4	7	40	9	4	1	30	15	6	2	7	15	4	10	59	10	4	11	38	10	4					
F.	30	9 5	8	21	9	5	9	1	9	6	2	45	15	6	3	23	15	10	—	—	—	—	0	15	10	6					
S.	31	9 53	9	38	9	8	10	10	9	11	3	58	16	3	4	31	16	9	0	50	10	10	1	21	11	2					
Half Mean Spring Range.			5 ft. 9 in.				10 ft. 5 in.								7 ft. 2 in.																
Phases of the Moon.																Moon's Declination at Noon.															
D. H. M.																M. D. ° ' "															
Full - - - 5 3 32 Morning.																1 21 N. 45 9 4 N. 7 17 22 S. 25 25 12 N. 7															
Last Quarter - 13 0 6 Morning.																2 22 39 10 0 S. 41 18 20 42 26 15 58															
New - - - 19 4 2 Afternoon.																3 22 33 11 5 34 19 17 30 27 19 1															
First Quarter - 26 4 54 Afternoon.																4 21 26 12 10 18 20 13 11 28 21 11															
																5 19 23 13 14 40 21 8 8 29 22 23															
In Apogee - 3 2 0 Afternoon.																6 16 29 14 18 23 22 2 46 30 22 35															
In Perigee - 18 5 0 Afternoon.																7 12 52 15 21 7 23 2 N. 34 31 21 46															
In Apogee - 30 12 0 Midnight.																8 8 42 16 22 33 24 7 36															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.

**BRITISH AND IRISH PORTS.**

**JANUARY, 1863.**

WEEK DAY.	MONTH DAY.	NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
		MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		
Th.	1	0 36	10 2	1 5	10 4	12 0	12 10	—	—	6 1	9 7	6 27	9 10	11'3						
F.	2	1 31	10 6	1 54	10 8	0 25	13 1	0 48	13 5	6 49	10 2	7 9	10 7	12'3						
S.	3	2 17	10 11	2 36	11 2	1 11	13 9	1 31	14 1	7 26	10 11	7 42	11 3	13'3						
S.	4	2 54	11 5	3 11	11 8	1 50	14 4	2 7	14 7	7 58	11 7	8 16	11 10	14'3						
M.	5	3 29	11 10	3 45	12 0	2 27	14 10	2 44	15 1	8 32	12 0	8 49	12 1	15'3						
Tu.	6	4 3	12 2	4 21	12 3	3 1	15 2	3 16	15 3	9 5	12 2	9 22	12 3	16'3						
W.	7	4 38	12 4	4 54	12 4	3 33	15 3	3 50	15 3	9 39	12 3	9 55	12 3	17'3						
Th.	8	5 10	12 3	5 28	12 3	4 6	15 3	4 23	15 2	10 13	12 2	10 31	12 3	18'3						
F.	9	5 46	12 2	6 5	12 1	4 41	15 1	4 59	15 1	10 50	12 0	11 8	11 10	19'3						
S.	10	6 23	12 0	6 42	11 11	5 17	15 0	5 37	14 10	11 29	11 7	11 50	11 5	20'3						
S.	11	7 2	11 9	7 21	11 7	5 57	14 7	6 18	14 4	—	—	0 10	11 2	21'3						
M.	12	7 43	11 4	8 8	11 0	6 40	14 1	7 3	13 10	0 31	10 11	0 55	10 8	22'3						
Tu.	13	8 35	10 8	9 6	10 5	7 30	13 6	8 0	13 3	1 21	10 5	1 51	10 2	23'3						
W.	14	9 39	10 4	10 16	10 3	8 33	13 1	9 9	13 0	2 24	10 0	3 1	9 11	24'3						
Th.	15	10 54	10 4	11 34	10 6	9 49	13 0	10 28	13 2	3 45	9 10	4 27	9 11	25'3						
F.	16	—	—	0 13	10 9	11 6	13 5	11 42	13 9	5 7	10 1	5 44	10 5	26'3						
S.	17	0 49	11 1	1 21	11 6	—	—	0 15	14 2	6 17	10 11	6 44	11 6	27'3						
S.	18	1 50	11 11	2 18	12 5	0 44	14 9	1 12	15 5	7 10	12 3	7 32	12 11	28'3						
M.	19	2 43	12 11	3 7	13 4	1 39	16 0	2 5	16 6	7 54	13 6	8 18	13 10	29'3						
Tu.	20	3 31	13 8	3 55	13 11	2 30	16 10	2 53	17 1	8 41	14 1	9 3	14 3	30'8						
W.	21	4 19	14 1	4 42	14 2	3 15	17 2	3 37	17 3	9 26	14 3	9 49	14 2	31'8						
Th.	22	5 5	14 0	5 27	13 10	3 59	17 2	4 21	17 0	10 11	14 0	10 33	13 9	32'8						
F.	23	5 48	13 8	6 10	13 4	4 39	16 9	5 6	16 5	10 55	13 4	11 17	12 11	33'8						
S.	24	6 31	13 0	6 53	12 8	5 25	16 1	5 47	15 8	11 40	12 5	—	—	34'8						
S.	25	7 13	12 3	7 35	11 9	6 9	15 2	6 32	14 8	0 1	12 0	0 23	11 6	35'8						
M.	26	7 59	11 3	8 23	10 8	6 54	14 1	7 17	13 6	0 46	10 11	1 9	10 5	36'8						
Tu.	27	8 49	10 3	9 19	9 10	7 44	13 1	8 13	12 7	1 34	10 0	2 4	9 6	37'8						
W.	28	9 54	9 6	10 32	9 4	8 46	12 2	9 25	11 11	2 38	9 2	3 19	8 10	38'8						
Th.	29	11 11	9 4	11 51	9 5	10 6	11 10	10 44	11 11	4 3	8 9	4 44	8 8	39'8						
F.	30	—	—	0 29	9 7	11 22	12 0	11 57	12 3	5 24	8 9	5 59	8 11	40'8						
S.	31	1 4	9 9	1 33	10 0	—	—	0 28	12 7	6 29	9 3	6 53	9 9	41'8						
Half Mean Spring Range.		6ft. 8in.						8ft. 2in.						6ft. 7in.						
Equation of Time at Noon.																				
M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.						
1	3 45	Sub.	9	7 19	Sub.	17	10 19	Sub.	25	12 35	Sub.	25	12 35	Sub.						
2	4 13		10	7 44		18	10 39		26	12 48		26	12 48							
3	4 41		11	8 8		19	10 58		27	13 1		27	13 1							
4	5 9		12	8 31		20	11 16		28	13 12		28	13 12							
5	5 36		13	8 54		21	11 33		29	13 23		29	13 23							
6	6 2		14	9 16		22	11 50		30	13 33		30	13 33							
7	6 28		15	9 38		23	12 6		31	13 43		31	13 43							
8	6 54		16	9 59		24	12 21													

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
**NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.**

## JANUARY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.														
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.										
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.													
Th.	1	9a32	9 10 8 4	9 39 8 5	8 37 20 9	9 4 21 2	3 3 15 11	3 34 16 4	F.	2	10 20	10 5 8 6	10 31 8 7	9 28 21 8	9 51 22 1	4 3 16 10	4 30 17 3	S.	3	11 9	10 52 8 8	11 13 8 9	10 10 22 6	10 29 22 9	4 54 17 8	5 16 18 0							
S.	4	11 57	11 33 8 10	11 54 8 11	10 46 23 1	11 6 23 5	5 37 18 4	5 59 18 8	M.	5	morn.	—	0 12 9 1	11 24 23 9	11 43 24 0	6 17 19 0	6 34 19 3	Tu.	6	0 44	0 31 9 2	0 49 9 3	—	0 1 24 2	6 52 19 5	7 9 19 7	7 41 19 9						
Tu.	7	1 30	1 7 9 3	1 24 9 4	0 18 24 5	0 34 24 7	7 25 19 8	7 9 19 7	W.	8	2 14	1 40 9 4	1 57 9 5	0 50 24 8	1 7 24 7	7 57 19 9	8 14 19 8	Th.	9	2 58	2 13 9 5	2 31 9 5	1 24 24 5	1 41 24 3	8 32 19 7	8 50 19 5	9 26 18 10						
Th.	10	3 41	2 48 9 4	3 7 9 4	1 58 24 1	2 17 23 9	9 9 19 2	9 26 18 10	F.	11	4 25	3 24 9 3	3 42 9 2	2 35 23 5	2 52 23 1	9 44 18 6	10 2 18 2	F.	12	5 12	4 2 9 1	4 22 9 0	3 12 22 9	3 33 22 3	10 20 17 10	10 42 17 5	11 28 16 5						
F.	13	6 0	4 46 8 11	5 11 8 9	3 57 21 9	4 25 21 4	11 4 16 11	11 28 16 5	S.	14	6 53	5 39 8 7	6 11 8 6	4 57 20 11	5 33 20 9	11 56 16 3	—	M.	15	7 50	6 49 8 5	7 30 8 5	6 15 20 9	6 59 21 0	0 31 16 1	1 13 16 2	2 43 17 2						
Tu.	16	8 50	8 11 8 7	8 51 8 9	7 40 21 6	8 20 22 2	1 59 16 6	2 43 17 2	W.	17	9 54	9 28 8 11	10 0 9 2	8 53 23 0	9 23 23 10	3 23 17 11	3 58 18 9	Th.	18	10 57	10 32 9 4	11 1 9 6	9 52 24 9	10 18 25 6	4 32 19 7	5 4 20 5	6 1 21 7						
W.	19	11 58	11 29 9 9	11 56 9 10	10 43 26 3	11 9 26 8	5 33 21 1	6 1 21 7	F.	20	0a56	—	0 23 10 0	11 35 27 2	11 59 27 6	6 26 22 0	6 50 22 5	F.	21	1 50	0 47 10 2	1 11 10 2	—	0 22 27 8	7 13 22 6	7 35 22 5	8 17 22 0						
Th.	22	2 41	1 35 10 2	1 56 10 2	0 45 27 8	1 6 27 6	7 55 22 3	8 17 22 0	S.	23	3 30	2 16 10 1	2 36 10 0	1 27 27 2	1 47 26 7	8 38 21 7	8 58 21 0	M.	24	4 18	2 56 9 10	3 16 9 8	2 7 25 11	2 27 25 1	9 19 20 4	9 38 19 8	10 14 18 2						
F.	25	5 4	3 35 9 6	3 55 9 3	2 46 24 5	3 5 23 7	9 56 18 11	10 14 18 2	Tu.	26	5 51	4 15 9 1	4 35 8 10	3 25 22 8	3 46 21 9	10 32 17 5	10 52 16 8	W.	27	6 39	4 57 8 8	5 22 8 5	4 10 21 0	4 37 20 2	11 12 15 10	11 38 15 2	12 15 2 8						
S.	28	7 27	5 51 8 0	6 27 8 0	5 10 19 6	5 49 19 1	—	0 10 14 8	Th.	29	8 16	7 6 7 10	7 47 7 10	6 34 18 11	7 17 19 0	0 47 14 5	1 31 14 4	F.	30	9 5	8 28 7 11	9 5 8 1	7 57 19 3	8 34 19 9	2 16 14 7	2 57 15 0	3 4 16 3						
Half Mean Spring Range.			4ft.		10in.				13ft.		0in.				10ft.		6in.																
Phases of the Moon.										Moon's Declination at Noon.																							
D. H. M.										M.D. ° '										M.D. ° '													
Full - - - - 5 3 32 Morning.										1 21 N.45 9 4N. 7 17 22 S.25 25 12 N. 7																							
Last Quarter - 13 0 6 Morning.										2 22 39 10 0 S.41 18 20 42 26 15 58																							
New - - - - 19 4 2 Afternoon.										3 22 33 11 5 34 19 17 30 27 19 1																							
First Quarter - 26 4 54 Afternoon.										4 21 26 12 10 18 20 13 11 28 21 11																							
										5 19 23 13 14 40 21 8 8 29 22 23																							
In Apogee - - 3 2 0 Afternoon.										6 16 29 14 18 23 22 2 46 30 22 35																							
In Perigee - - 18 5 0 Afternoon.										7 12 52 15 21 7 23 2 N.34 31 21 46																							
In Apogee - - 30 12 0 Midnight.										8 8 42 16 22 33 24 7 36																							

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.



**BRITISH AND IRISH PORTS.**

**JANUARY, 1863.**

WEEK DAY.	MONTH DAY.	WESTON-SUPER-MARE.								HOLYHEAD.								KINGSTOWN.								C's Age at Noon.	
		MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.					
		Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.				D.
Th.	1	3	37	29	1	4	10	29	7	7	33	12	11	8	0	13	2	8	23	9	2	8	51	9	3	11.3	
F.	2	4	41	30	3	5	10	31	0	8	24	13	5	8	47	13	8	9	18	9	5	9	44	9	6	12.3	
S.	3	5	34	31	9	5	57	32	3	9	5	13	10	9	24	14	1	10	4	9	8	10	23	9	10	13.3	
Th.	4	6	18	32	10	6	40	33	5	9	42	14	3	10	1	14	6	10	39	10	0	10	58	10	2	14.3	
M.	5	6	58	33	10	7	17	34	3	10	18	14	8	10	34	14	10	11	14	10	3	11	31	10	4	○	
Tu.	6	7	35	34	8	7	52	35	0	10	49	14	11	11	5	15	0	11	48	10	4	—	—			16.3	
W.	7	8	8	35	2	8	23	35	4	11	20	15	1	11	35	15	1	0	6	10	5	0	23	10	5	17.3	
Th.	8	8	39	35	4	8	55	35	4	11	53	15	1	—	—	—	—	0	39	10	5	0	57	10	4	18.3	
F.	9	9	12	35	3	9	28	35	1	0	12	15	0	0	31	14	11	1	15	10	3	1	34	10	2	19.3	
S.	10	9	45	34	8	10	1	34	3	0	51	14	10	1	11	14	8	1	52	10	1	2	11	10	0	20.3	
Th.	11	10	16	33	8	10	32	33	1	1	31	14	5	1	51	14	3	2	31	9	11	2	51	9	10	21.3	
M.	12	10	49	32	5	11	9	31	7	2	13	14	0	2	36	13	9	3	12	9	8	3	35	9	7	22.3	
Tu.	13	11	31	30	10	11	59	30	3	3	2	13	6	3	32	13	3	4	0	9	5	4	30	9	3	○	
W.	14	—	—	—	—	0	31	29	9	4	5	13	1	4	42	13	0	5	2	9	2	5	35	9	1	24.3	
Th.	15	1	8	29	7	1	50	29	9	5	22	13	0	6	2	13	3	6	12	9	1	6	49	9	2	25.3	
F.	16	2	33	30	4	3	16	31	2	6	40	13	6	7	16	13	10	7	27	9	5	8	4	9	8	26.3	
S.	17	3	58	32	2	4	36	33	6	7	49	14	3	8	19	14	9	8	40	9	10	9	13	10	2	27.3	
Th.	18	5	13	34	11	5	45	36	3	8	48	15	3	9	13	15	9	9	46	10	5	10	12	10	9	28.3	
M.	19	6	14	37	4	6	43	38	1	9	38	16	2	10	3	16	6	10	36	11	0	10	59	11	3	●	
Tu.	20	7	9	38	9	7	34	39	6	10	26	16	9	10	47	16	11	11	23	11	5	11	46	11	6	0.8	
W.	21	7	57	39	8	8	19	39	8	11	8	17	0	11	30	16	11	—	—	—	—	0	10	11	6	1.8	
Th.	22	8	39	39	6	8	59	39	2	11	52	16	10	—	—	—	—	0	33	11	5	0	55	11	4	2.8	
F.	23	9	18	38	6	9	36	37	9	0	14	16	7	0	36	16	4	1	17	11	2	1	39	11	0	3.8	
S.	24	9	55	36	8	10	12	35	7	0	59	15	11	1	21	15	5	2	0	10	9	2	22	10	6	4.8	
Th.	25	10	27	34	4	10	43	33	0	1	43	15	0	2	5	14	6	2	43	10	3	3	5	10	0	5.8	
M.	26	11	0	31	8	11	19	30	5	2	27	14	0	2	50	13	6	3	26	9	8	3	48	9	5	○	
Tu.	27	11	42	29	2	—	—	—	—	3	15	13	0	3	45	12	7	4	14	9	2	4	43	8	11	7.8	
W.	28	0	11	28	1	0	46	27	3	4	19	12	3	4	58	12	0	5	15	8	8	5	50	8	6	8.8	
Th.	29	1	26	26	10	2	8	26	10	5	39	11	11	6	18	12	0	6	27	8	6	7	5	8	6	9.8	
F.	30	2	50	27	1	3	30	27	7	6	56	12	1	7	31	12	4	7	43	8	8	8	18	8	10	10.8	
S.	31	4	8	28	5	4	41	29	4	8	1	12	8	8	27	13	0	8	52	9	0	9	20	9	2	11.8	
Half Mean Spring Range.		18ft. 7in.								8ft. 0in.								5ft. 6in.									
Equation of Time at Noon.																											
M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	
1	3 45	Sub.	9	7 19	Sub.	17	10 19	Sub.	25	12 35	Sub.	1	3 45	Sub.	9	7 19	Sub.	17	10 19	Sub.	25	12 35	Sub.	1	3 45	Sub.	
2	4 13		10	7 44		18	10 39		26	12 48		2	4 13		10	7 44		18	10 39		26	12 48		2	4 13		
3	4 41		11	8 8		19	10 58		27	13 1		3	4 41		11	8 8		19	10 58		27	13 1		3	4 41		
4	5 9		12	8 31		20	11 16		28	13 12		4	5 9		12	8 31		20	11 16		28	13 12		4	5 9		
5	5 36		13	8 54		21	11 33		29	13 23		5	5 36		13	8 54		21	11 33		29	13 23		5	5 36		
6	6 2		14	9 16		22	11 50		30	13 33		6	6 2		14	9 16		22	11 50		30	13 33		6	6 2		
7	6 28		15	9 38		23	12 6		31	13 43		7	6 28		15	9 38		23	12 6		31	13 43		7	6 28		
8	6 54		16	9 59		24	12 21					8	6 54		16	9 59											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—**WESTON-SUPER-MARE** add 12 m. | **HOLYHEAD** add 18 m. | **KINGSTOWN** subtract 1 m. for Dublin Time.

## FEBRUARY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.								DEVONPORT.								PORTSMOUTH.																																						
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.																																						
			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.																																	
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																															
S.	1	10 41	2 16	14 11	2 37	15 7	3 51	13 3	4 16	12 11	10 10	10 9																																													
M.	2	11 27	2 55	16 2	3 13	16 9	4 39	13 11	5 0	13 6	10 51	11 4																																													
Tu.	3	morn.	3 32	17 4	3 49	17 9	5 21	14 7	5 41	14 1	11 28	11 9																																													
W.	4	0 12	4 5	18 1	4 22	18 4	5 58	15 1	6 15	14 5	—	—																																													
Th.	5	0 56	4 38	18 7	4 53	18 9	6 33	15 4	6 50	14 11	0 18	12 3																																													
F.	6	1 40	5 8	18 10	5 24	18 10	7 6	15 5	7 20	14 10	0 51	12 5																																													
S.	7	2 25	5 41	18 9	5 57	18 8	7 36	15 4	7 52	14 9	1 25	12 6																																													
S.	8	3 10	6 15	18 5	6 32	18 2	8 9	15 0	8 28	14 5	1 59	12 5																																													
M.	9	3 58	6 51	17 9	7 10	17 2	8 45	14 5	9 14	14 1	2 33	12 3																																													
Tu.	10	4 48	7 32	16 7	7 55	15 11	9 18	13 11	9 39	13 7	3 11	11 10																																													
W.	11	5 42	8 20	15 3	8 49	14 8	10 3	13 4	10 27	13 1	3 53	11 3																																													
Th.	12	6 39	9 22	14 3	10 3	14 0	10 59	12 9	11 30	12 8	4 46	10 8																																													
F.	13	7 39	10 50	14 0	11 40	14 4	—	—	0 10	12 3	5 56	10 2																																													
S.	14	8 40	—	—	0 26	14 10	0 55	12 9	1 43	12 7	7 28	10 3																																													
S.	15	9 40	1 6	15 6	1 40	16 5	2 27	13 6	3 10	13 5	8 57	11 1																																													
M.	16	10 39	2 8	17 5	2 34	18 3	3 48	14 7	4 18	14 4	10 2	12 0																																													
Tu.	17	11 34	2 58	19 2	3 21	19 9	4 46	15 7	5 13	15 2	10 54	12 9																																													
W.	18	0 27	3 43	20 3	4 5	20 6	5 39	16 3	6 2	15 8	11 39	13 3																																													
Th.	19	1 17	4 27	20 8	4 47	20 8	6 25	16 7	6 47	16 0	—	—																																													
F.	20	2 6	5 6	20 7	5 26	20 4	7 9	16 7	7 26	15 11	0 44	13 5																																													
S.	21	2 55	5 45	19 11	6 2	19 5	7 43	16 1	8 1	15 6	1 26	13 2																																													
S.	22	3 43	6 20	18 10	6 38	18 2	8 18	15 4	8 36	14 9	2 3	12 10																																													
M.	23	4 32	6 56	17 4	7 14	16 6	8 50	14 5	9 5	13 11	2 39	12 3																																													
Tu.	24	5 20	7 35	15 7	7 56	14 8	9 21	13 6	9 41	13 1	3 15	11 6																																													
W.	25	6 10	8 18	13 10	8 43	13 2	9 58	12 5	10 19	12 3	3 54	10 8																																													
Th.	26	6 59	9 17	12 7	9 56	12 3	10 43	11 6	11 12	11 6	4 40	9 11																																													
F.	27	7 47	10 42	12 2	11 29	12 3	11 52	10 11	—	—	5 49	9 3																																													
S.	28	8 35	—	—	0 11	12 6	0 33	11 5	1 16	11 1	7 18	9 3																																													
Half Mean Spring Range.			9 ft. 6 in.								7 ft. 9 in.								6 ft.																																						
Phases of the Moon.																												Moon's Declination at Noon.																													
D. H. M.																												M. D.	°	'	M. D.	°	'	M. D.	°	'																					
Full - - - - 3 10 25 Afternoon.																												1	20	N. 0	9	13	S. 28	17	10	S. 30																					
Last Quarter - 11 10 46 Morning.																												2	17	20	10	17	18	18	5	17																					
New - - - - 18 3 6 Morning.																												3	13	55	11	20	15	19	0	N. 7																					
First Quarter - 25 0 34 Afternoon.																												4	9	53	12	22	3	20	5	22																					
																												5	5	22	13	22	29	21	10	12																					
																												6	0	35	14	21	25	22	14	24																					
In Perigee - - 15 11 0 Afternoon.																												7	4	S. 17	15	18	55	23	17	49																					
In Apogee - - 27 6 0 Afternoon.																												8	9	3	16	15	10	24	20	20																					

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH

## FEBRUARY, 1863.

WEEK DAY.	MONTH DAY.	DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	
	1	9 33	15 5	9 55	15 11	11 29	13 9	11 50	14 0	0 31	15 9	0 57	16 1	12.8
	2	10 15	16 4	10 36	16 9	—	—	0 10	14 4	1 19	16 5	1 40	16 10	13.8
	3	10 55	17 2	11 13	17 6	0 28	14 7	0 46	14 11	2 1	17 2	2 18	17 6	14.8
	4	11 32	17 10	11 51	18 1	1 5	15 2	1 22	15 5	2 35	17 10	2 53	18 2	15.8
	5	—	—	0 7	18 3	1 37	15 7	1 54	15 9	3 8	18 5	3 24	18 8	16.8
	6	0 25	18 5	0 43	18 6	2 10	15 10	2 24	15 11	3 39	18 10	3 55	19 0	17.8
	7	1 0	18 7	1 19	18 6	2 40	15 11	2 55	15 11	4 9	19 1	4 27	19 1	18.8
	8	1 36	18 5	1 55	18 4	3 11	15 11	3 27	15 9	4 42	19 1	4 58	19 0	19.8
	9	2 13	18 2	2 33	17 11	3 44	15 7	4 2	15 5	5 15	18 10	5 33	18 8	20.8
	10	2 53	17 6	3 13	17 0	4 21	15 3	4 41	14 11	5 52	18 5	6 12	18 1	21.8
	11	3 34	16 6	3 58	16 0	5 2	14 7	5 25	14 3	6 32	17 9	6 57	17 4	22.8
	12	4 26	15 6	4 55	15 0	5 53	13 11	6 24	13 7	7 22	17 0	7 53	16 7	23.8
	13	5 30	14 8	6 10	14 8	7 1	13 3	7 44	13 2	8 29	16 3	9 12	16 2	24.8
	14	6 54	14 11	7 39	15 5	8 32	13 3	9 19	13 7	9 57	16 0	10 43	16 2	25.8
	15	8 21	15 11	8 55	16 9	10 3	14 0	10 42	14 5	11 30	16 5	—	—	26.8
	16	9 25	17 5	9 53	18 11	11 14	14 11	11 41	15 5	0 10	16 11	0 42	17 5	27.8
	17	10 19	18 8	10 45	19 2	—	—	0 7	15 10	1 11	18 0	1 37	18 6	28.8
	18	11 9	19 7	11 33	19 10	0 31	16 3	0 54	16 7	2 2	19 0	2 25	19 5	29.8
	19	11 56	19 11	—	—	1 16	16 10	1 37	17 0	2 47	19 9	3 8	20 0	1.4
	20	0 18	20 0	0 39	19 11	1 59	17 1	2 18	17 0	3 30	20 2	3 49	20 2	2.4
	21	1 1	19 9	1 22	19 5	2 37	16 11	2 57	16 9	4 9	20 2	4 27	20 0	3.4
	22	1 41	19 1	2 1	18 8	3 15	16 6	3 32	16 2	4 45	19 9	5 4	19 5	4.4
	23	2 19	18 2	2 38	17 7	3 50	15 10	4 8	15 5	5 22	19 1	5 41	18 8	5.4
	24	2 57	16 11	3 16	16 3	4 26	15 0	4 45	14 6	5 58	18 2	6 17	17 8	6.4
	25	3 35	15 6	3 56	14 10	5 5	14 0	5 28	13 6	6 36	17 2	6 57	16 7	7.4
	26	4 20	14 3	4 48	13 8	5 51	13 1	6 19	12 9	7 20	16 1	7 47	15 8	8.4
	27	5 23	13 3	6 3	13 1	6 56	12 4	7 37	12 2	8 24	15 3	9 7	15 0	9.4
	28	6 44	13 2	7 24	13 6	8 24	12 3	9 9	12 4	9 48	14 10	10 29	14 11	10.4

Half Mean Spring } 9ft. 4in.  
Range.

8ft. 0in.

9ft. 7in.

## Equation of Time at Noon.

M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
1	13 51	Sub.	9	14 29	Sub.	17	14 17	Sub.	25	13 21	Sub.
2	13 59		10	14 30		18	14 12		26	13 11	
3	14 5		11	14 30		19	14 7		27	13 0	
4	14 11		12	14 30		20	14 1		28	12 49	
5	14 16		13	14 29		21	13 54				
6	14 21		14	14 27		22	13 47				
7	14 24		15	14 24		23	13 39				
8	14 27		16	14 21		24	13 30				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m.      SHEERNESS subtract 8 m.      LONDON 0 m.



## FEBRUARY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.			
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.								
			H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.					
S.	1	10a.41	10 38	10 1	11 1	10 4	4 58	17 3	5 19	17 9	1 48	11 6	2 11	11												
M.	2	11 27	11 21	10 6	11 40	10 9	5 38	18 2	5 56	18 7	2 33	12 3	2 52	12												
Tu.	3	morn.	11 59	10 11	—	—	6 15	19 0	6 34	19 4	3 11	12 10	3 28	13												
W.	4	0 12	0 18	11 1	0 35	11 2	6 52	19 8	7 9	20 0	3 44	13 5	4 0	13												
Th.	5	0 56	0 50	11 3	1 6	11 4	7 25	20 3	7 41	20 5	4 17	13 11	4 32	14												
F.	6	1 40	1 22	11 5	1 39	11 5	7 57	20 7	8 13	20 8	4 47	14 2	5 3	14												
S.	7	2 25	1 53	11 4	2 10	11 4	8 28	20 9	8 45	20 8	5 19	14 2	5 36	14												
S.	8	3 10	2 28	11 4	2 44	11 3	9 2	20 6	9 20	20 2	5 53	13 11	6 11	13												
M.	9	3 58	3 2	11 1	3 20	11 0	9 38	19 11	9 57	19 6	6 29	13 6	6 50	13												
W.	10	4 48	3 40	10 11	3 58	10 9	10 16	19 1	10 38	18 7	7 11	13 0	7 34	12												
Tu.	11	5 42	4 18	10 6	4 39	10 4	11 2	18 2	11 33	17 7	7 57	12 3	8 25	11												
Th.	12	6 39	5 6	10 2	5 35	10 0	—	—	0 8	17 1	8 56	11 7	9 32	11												
F.	13	7 39	6 8	9 10	6 50	9 9	0 46	16 8	1 25	16 6	10 15	11 2	10 59	11												
S.	14	8 40	7 40	9 10	8 27	10 0	2 8	16 7	2 50	16 11	11 44	11 4	—	—												
S.	15	9 40	9 10	10 3	9 49	10 6	3 31	17 7	4 11	18 4	0 23	11 9	1 1	12												
M.	16	10 39	10 23	10 11	10 52	11 3	4 43	19 1	5 10	19 10	1 33	12 10	2 3	13												
Tu.	17	11 34	11 18	11 7	11 44	11 10	5 35	20 6	6 0	21 1	2 30	13 11	2 56	14												
W.	18	0a.27	—	—	0 7	12 0	6 24	21 6	6 46	21 10	3 19	14 8	3 39	15												
Th.	19	1 17	0 29	12 1	0 49	12 2	7 8	22 1	7 30	22 3	4 0	15 3	4 21	15												
F.	20	2 6	1 11	12 2	1 32	12 2	7 51	22 3	8 11	22 2	4 41	15 5	5 0	15												
S.	21	2 55	1 52	12 1	2 12	11 11	8 30	22 0	8 49	21 7	5 20	15 2	5 39	14												
S.	22	3 43	2 31	11 9	2 49	11 6	9 7	21 1	9 26	20 6	5 58	14 5	6 17	13												
M.	23	4 32	3 8	11 3	3 26	11 0	9 44	19 10	10 2	19 2	6 35	13 6	6 55	13												
Tu.	24	5 20	3 44	10 9	4 2	10 5	10 20	18 6	10 41	17 9	7 16	12 7	7 37	12												
W.	25	6 10	4 21	10 2	4 41	9 10	11 6	17 0	11 33	16 4	8 0	11 6	8 23	11												
Th.	26	6 59	5 4	9 7	5 29	9 5	—	—	0 4	15 10	8 51	10 8	9 27	10												
F.	27	7 47	6 3	9 3	6 44	9 1	0 41	15 3	1 19	15 0	10 8	10 1	10 52	10												
S.	28	8 35	7 32	9 2	8 17	9 3	2 0	14 11	2 41	15 1	11 34	10 1	—	—												
Half Mean Spring } Range.			5ft. 9in.								10ft. 5in.								7ft. 2in.							
Phases of the Moon.										Moon's Declination at Noon.																
D. H. M.										M.D. ° ' M.D. ° ' M.D. ° ' M.D. °																
Full - - - - 3 10 25 Afternoon.										1 20N. 0 9 13 S. 28 17 10 S. 30 25 21 N																
Last Quarter - 11 10 46 Morning.										2 17 20 10 17 18 18 5 17 26 22																
New - - - - 18 3 6 Morning.										3 13 55 11 20 15 19 0N. 7 27 21																
First Quarter 25 0 34 Afternoon.										4 9 53 12 22 3 20 5 22 28 20																
In Perigee - - 15 11 0 Afternoon.										5 5 22 13 22 29 21 10 12																
In Apogee - - 27 6 0 Afternoon.										6 0 35 14 21 25 22 14 24																
										7 4 S. 17 15 18 55 23 17 49																
										8 9 3 16 15 10 24 20 20																

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,

HARWICH subtract 5 m.

HULL add 1 m.

SUNDERLAND add 5 m.

## FEBRUARY, 1863.

WATER LVL.	MONTH DAY.	NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
		MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.	
	1	1 58	10 4	2 18	10 8	0 52	13 0	1 12	13 5	7 12	10 3	7 29	10 9	12.8						
	2	2 37	11 0	2 55	11 5	1 32	13 10	1 51	14 4	7 44	11 2	8 0	11 8	13.8						
	3	3 12	11 9	3 29	12 1	2 9	14 9	2 27	15 1	8 16	12 1	8 32	12 5	15.8						
	4	3 45	12 4	4 1	12 7	2 44	15 5	2 59	15 8	8 47	12 8	9 2	12 10	16.8						
	5	4 17	12 9	4 33	12 11	3 14	15 10	3 29	15 11	9 17	12 11	9 33	13 0	16.8						
	6	4 49	13 0	5 6	13 0	3 44	16 0	4 0	16 0	9 50	13 0	10 6	12 11	17.8						
	7	5 22	12 11	5 39	12 10	4 16	15 11	4 33	15 10	10 24	12 10	10 41	12 9	18.8						
	8	5 56	12 9	6 15	12 7	4 51	15 9	5 9	15 7	11 0	12 6	11 19	12 3	19.8						
	9	6 34	12 5	6 53	12 3	5 27	15 5	5 48	15 2	11 40	11 11	—	—	20.8						
	10	7 13	11 11	7 35	11 7	6 9	14 10	6 32	14 5	0 1	11 7	0 23	11 3	21.8						
	11	8 1	11 2	8 31	10 9	6 56	14 0	7 25	13 7	0 48	10 10	1 17	10 5	22.8						
	12	9 4	10 4	9 43	10 2	7 59	13 2	8 36	12 10	1 49	10 1	2 27	9 10	23.8						
	13	10 27	10 1	11 11	10 2	9 20	12 9	10 6	12 9	3 12	9 8	4 3	9 8	24.8						
	14	11 57	10 5	—	—	10 50	13 0	11 30	13 5	4 50	9 9	5 32	10 0	25.8						
	15	0 37	10 9	1 14	11 2	—	—	0 8	13 11	6 10	10 7	6 38	11 2	26.8						
	16	1 43	11 8	2 9	12 2	0 37	14 5	1 3	15 1	7 3	11 11	7 25	12 7	27.8						
	17	2 34	12 9	2 57	13 3	1 29	15 9	1 54	16 4	7 45	13 3	8 6	13 9	28.8						
	18	3 19	13 7	3 39	13 11	2 16	16 9	2 38	17 2	8 26	14 2	8 46	14 4	29.8						
	19	4 0	14 2	4 22	14 3	3 58	17 4	3 18	17 5	9 6	14 5	9 26	14 4	30.8						
	20	4 42	14 3	5 2	14 1	3 38	17 4	3 58	17 2	9 47	14 2	10 8	13 11	31.4						
	21	5 23	13 10	5 43	13 6	4 18	16 11	4 37	16 7	10 27	13 7	10 46	13 2	32.4						
	22	6 2	13 2	6 21	12 10	4 56	16 3	5 15	15 10	11 6	12 9	11 25	12 3	33.4						
	23	6 39	12 5	6 58	12 0	5 34	15 5	5 54	14 11	11 46	11 8	—	—	34.4						
	24	7 17	11 6	7 39	11 0	6 14	14 4	6 36	13 9	0 6	11 2	0 27	10 7	35.4						
	25	8 4	10 4	8 30	9 10	6 59	13 1	7 25	12 7	0 51	10 0	1 15	9 6	36.4						
	26	9 0	9 5	9 38	9 2	7 54	12 2	8 31	11 9	1 45	9 1	2 22	8 8	37.4						
	27	10 20	9 0	11 4	9 0	9 13	11 6	9 59	11 5	3 6	8 5	3 55	8 4	38.4						
	28	11 47	9 1	—	—	10 40	11 7	11 18	11 9	4 40	8 4	5 19	8 6	39.4						
Half Mean Spring Range.		6ft. 8in.						8ft. 2in.						6ft. 7in.						

## Equation of Time at Noon.

M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
1	13 51	Sub.	9	14 29	Sub.	17	14 17	Sub.	25	13 21	Sub.
2	13 59		10	14 30		18	14 12		26	13 11	
3	14 5		11	14 30		19	14 7		27	13 0	
4	14 11		12	14 30		20	14 1		28	12 49	
5	14 16		13	14 29		21	13 54				
6	14 21		14	14 27		22	13 47				
7	14 24		15	14 24		23	13 39				
8	14 27		16	14 21		24	13 30				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

NORTH SHIELDS add 6 m.

LEITH add 13 m.

THURSO add 14 m.

FEBRUARY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
		H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		
S.	1	10 41	10 31	8 6	10 52	8 8		9 52	21 7		10 12	22 3		4 29	16 10		4 53	17 3		
M.	2	11 27	11 12	8 9	11 33	8 11		10 30	22 10		10 47	23 4		5 17	18 0		5 38	18 7		
Tu.	3	morn.	11 53	9 1	—	—		11 6	23 10		11 23	24 3		5 57	19 0		6 15	19 6		
W.	4	0 12	0 11	9 2	0 28	9 4		11 40	24 9		11 57	25 2		6 32	19 11		6 48	20 3		
Th.	5	0 56	0 45	9 6	1 1	9 7		—	—		0 13	25 5		7 4	20 6		7 19	20 8		
F.	6	1 40	1 18	9 8	1 35	9 8		0 29	25 8		0 46	25 9		7 35	20 9		7 51	20 9		
S.	7	2 25	1 50	9 9	2 7	9 9		1 2	25 10		1 18	25 8		8 7	20 8		8 24	20 7		
S.	8	3 10	2 24	9 8	2 41	9 8		1 34	25 6		1 51	25 2		8 42	20 4		9 0	20 1		
M.	9	3 58	2 58	9 7	3 17	9 5		2 8	24 9		2 27	24 4		9 19	19 8		9 37	19 2		
Tu.	10	4 48	3 35	9 4	3 55	9 2		2 46	23 9		3 5	23 2		9 55	18 7		10 15	18 1		
W.	11	5 42	4 17	9 1	4 42	8 11		3 28	22 7		3 53	21 10		10 39	17 5		11 4	16 9		
Th.	12	6 39	5 10	8 8	5 43	8 6		4 24	21 2		5 0	20 7		11 31	16 2		—	—		
F.	13	7 39	6 22	8 4	7 6	8 3		5 44	20 4		6 34	20 5		0 6	15 11		0 47	15 9		
S.	14	8 40	7 53	8 4	8 38	8 6		7 23	20 10		8 6	21 6		1 38	16 0		2 28	16 7		
S.	15	9 40	9 19	8 9	9 53	9 0		8 46	22 5		9 16	23 4		3 12	17 4		3 48	18 4		
M.	16	10 39	10 23	9 3	10 50	9 6		9 43	24 4		10 9	25 3		4 22	19 3		4 52	20 2		
Tu.	17	11 34	11 16	9 8	11 42	9 10		10 33	26 1		10 56	26 8		5 20	20 11		5 47	21 6		
W.	18	0 27	—	—	0 5	10 0		11 18	27 2		11 40	27 7		6 9	22 0		6 31	22 4		
Th.	19	1 17	0 28	10 1	0 50	10 2		—	—		0 2	27 9		6 53	22 7		7 13	22 8		
F.	20	2 6	1 11	10 3	1 32	10 3		0 22	27 10		0 42	27 9		7 33	22 6		7 53	22 3		
S.	21	2 55	1 52	10 2	2 11	10 1		1 3	27 5		1 21	26 11		8 11	21 10		8 29	21 3		
S.	22	3 43	2 28	9 11	2 47	9 9		1 38	26 3		1 56	25 6		8 48	20 8		9 6	20 0		
M.	23	4 32	3 4	9 7	3 21	9 4		2 14	24 9		2 32	23 11		9 24	19 3		9 41	18 6		
Tu.	24	5 20	3 38	9 2	3 58	8 11		2 50	23 0		3 9	22 1		9 58	17 8		10 16	16 10		
W.	25	6 10	4 18	8 8	4 40	8 5		3 29	21 1		3 51	20 3		10 36	16 0		10 56	15 3		
Th.	26	6 59	5 5	8 3	5 37	8 0		4 19	19 5		4 55	18 9		11 24	14 6		11 59	14 1		
F.	27	7 47	6 15	7 10	6 59	7 8		5 37	18 4		6 26	18 3		—	—		0 40	13 11		
S.	28	8 35	7 43	7 8	8 23	7 10		7 13	18 6		7 52	18 10		1 26	13 11		2 11	14 2		
Half Mean Spring Range.			4 ft. 10 in.						13 ft. 0 in.						10 ft. 6 in.					
Phases of the Moon.									Moon's Declination at Noon.											
D. H. M.									M. D.	°	'	M. D.	°	'	M. D.	°	'	M. D.	°	'
Full	—	—	3	10	25	Afternoon.		1	20	N. 0	9	13	S. 28	17	10	S. 30	25	21	N. 5	
Last Quarter	—	—	11	10	46	Morning.		2	17	20	10	17	18	18	5	17	26	22	2	
New	—	—	18	3	6	Morning.		3	13	55	11	20	15	19	0	N. 7	27	21	55	
First Quarter	—	—	25	0	34	Afternoon.		4	9	53	12	22	3	20	5	22	28	20	27	
									5	5	22	13	22	29	21	10	12			
									6	0	35	14	21	25	22	14	24			
In Perigee	—	—	15	11	0	Afternoon.		7	4	S. 17	15	18	55	23	17	49				
In Apogee	—	—	27	6	0	Afternoon.		8	9	3	16	15	10	24	20	20				

The times of High Water are given for Mean Time at Place ; if Greenwich or Railway Time be required,—for GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

## FEBRUARY, 1863.

MONTH DAY.	WESTON-SUPER-MARE.								HOLYHEAD.								KINGSTOWN.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	Time. H. M. F. L.	Height. F. I.	D.						
1	5 8 30	4	5 33 31	4	8 48 13	5	9 7 13	9	9 44 9	5	10 6 9	7	12 8												
2	5 56 32	3	6 18 33	2	9 25 14	1	9 42 14	5	10 24 9	10	10 41 10	0	13 8												
3	6 38 34	0	6 57 34	8	10 0 14	9	10 17 15	0	10 58 10	3	11 14 10	5	15 8												
4	7 15 35	4	7 32 35	11	10 32 15	3	10 47 15	6	11 29 10	7	11 45 10	8	16 8												
5	7 48 36	6	8 3 36	9	11 1 15	8	11 15 15	9	—	—	0 1 10	9	17 8												
6	8 19 36	11	8 34 37	0	11 30 15	10	11 46 15	10	0 17 10	9	0 34 10	9	18 8												
7	8 50 37	0	9 6 36	10	—	—	0 4 15	9	0 50 10	9	1 7 10	9	19 8												
8	9 22 36	6	9 38 36	2	0 22 15	8	0 41 15	6	1 25 10	8	1 44 10	6	20 8												
9	9 55 35	6	10 11 34	8	1 1 15	3	1 22 15	0	2 2 10	4	2 22 10	2	21 8												
10	10 27 33	9	10 44 32	10	1 43 14	8	2 5 14	3	2 43 10	0	3 5 9	10	22 8												
11	11 6 31	9	11 31 30	7	2 29 13	11	2 58 13	6	3 29 9	8	3 56 9	5	23 8												
12	—	—	0 3 29	9	3 30 13	2	4 8 12	10	4 29 9	2	5 6 9	0	24 8												
13	0 41 29	2	1 26 29	1	4 53 12	9	5 39 12	10	5 45 8	11	6 28 9	0	25 8												
14	2 14 29	5	3 0 30	3	6 24 13	1	7 4 13	5	7 11 9	2	7 51 9	5	26 8												
15	3 45 31	5	4 26 32	9	7 42 13	11	8 12 14	6	8 31 9	8	9 5 10	0	27 8												
16	5 13 34	4	5 33 35	9	8 39 15	1	9 4 15	7	9 36 10	4	10 3 10	8	28 8												
17	6 1 37	1	6 28 38	0	9 27 16	1	9 50 16	5	10 26 10	11	10 47 11	2	29 8												
18	6 51 38	9	7 14 39	4	10 11 16	9	10 31 16	11	11 7 11	4	11 28 11	6	30 8												
19	7 37 39	10	7 57 39	11	10 50 17	1	11 9 17	11	11 49 11	7	—	—	1 4												
20	8 17 39	9	8 36 39	4	11 28 17	0	11 48 16	9	0 10 11	6	0 31 11	5	2 4												
21	8 54 38	9	9 10 38	0	—	—	0 8 16	6	0 52 11	4	1 11 11	2	3 4												
22	9 27 37	2	9 43 36	1	0 27 16	2	0 47 15	8	1 30 10	11	1 49 10	8	4 4												
23	9 59 34	10	10 13 33	7	1 7 15	3	1 27 14	8	2 8 10	4	2 28 10	1	5 4												
24	10 28 32	2	10 44 30	9	1 47 14	2	2 9 13	7	2 47 9	9	3 8 9	6	6 4												
25	11 3 29	5	11 26 28	2	2 32 13	1	2 56 12	7	3 31 9	2	3 55 8	11	7												
26	11 57 27	1	—	—	3 26 12	1	4 3 11	9	4 24 8	8	5 1 8	5	8 4												
27	0 35 26	3	1 18 26	0	4 46 11	6	5 32 11	6	5 39 8	3	6 21 8	3	9 4												
28	2 4 26	1	2 45 26	6	6 14 11	8	6 52 11	11	7 1 8	4	7 39 8	6	10 4												

Half Mean Spring } 18ft. 7in.  
Range.

8ft. 0in.

5ft. 6in.

## Equation of Time at Noon.

D.	M.	S.	Sub.	M.D.	M.	S.	Sub.	M.D.	M.	S.	Sub.	M.D.	M.	S.	Sub.
1	13	51		9	14	29		17	14	17		25	13	21	
2	13	59		10	14	30		18	14	12		26	13	11	
3	14	5		11	14	30		19	14	7		27	13	0	
4	14	11		12	14	30		20	14	1		28	12	49	
5	14	16		13	14	29		21	13	54					
6	14	21		14	14	27		22	13	47					
7	14	24		15	14	24		23	13	39					
8	14	27		16	14	21		24	13	30					

times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## FEBRUARY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.																	
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.														
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.													
			H. M.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.													
S.	1	10 41	9 22	8 5		9 42	8 7	6 32	6 4	6 52	6 6	3 52	9 0	4 9																		
M.	2	11 27	10 0	8 9		10 18	8 11	7 11	6 8	7 30	6 10	4 26	9 8	4 44																		
Tu.	3	morn.	10 36	9 0		10 52	9 2	7 50	7 0	8 7	7 2	5 2	10 3	5 20																		
W.	4	0 12	11 8	9 3		11 24	9 3	8 22	7 4	8 37	7 6	5 37	10 9	5 53																		
Th.	5	0 56	11 39	9 4		11 54	9 4	8 52	7 7	9 5	7 7	6 9	11 0	6 23																		
F.	6	1 40	—	—		0 9	9 4	9 20	7 6	9 35	7 6	6 39	11 0	6 55																		
S.	7	2 25	0 25	9 4		0 43	9 4	9 51	7 5	10 7	7 4	7 12	10 10	7 30																		
S.	8	3 10	1 1	9 4		1 20	9 3	10 23	7 2	10 41	7 1	7 47	10 6	8 5																		
M.	9	3 58	1 40	9 2		2 0	9 1	11 1	6 11	11 22	6 8	8 24	10 0	8 44																		
Tu.	10	4 48	2 23	9 0		2 47	8 10	11 49	6 5	—	—	9 6	9 6	9 33																		
W.	11	5 42	3 12	8 8		3 40	8 6	0 19	6 2	0 55	5 11	10 4	8 11	10 39																		
Th.	12	6 39	4 11	8 4		4 47	8 3	1 35	5 9	2 20	5 8	11 18	8 6	12 0																		
F.	13	7 39	5 27	8 2		6 9	8 1	3 4	5 9	3 47	5 11	—	—	0 43																		
S.	14	8 40	6 55	8 1		7 38	8 3	4 27	6 2	5 1	6 5	1 29	8 8	2 10																		
S.	15	9 40	8 16	8 6		8 46	8 9	5 32	6 8	5 58	6 11	2 49	9 4	3 17																		
M.	16	10 39	9 13	9 0		9 39	9 3	6 23	7 3	6 49	7 6	3 43	10 3	4 6																		
Tu.	17	11 34	10 3	9 6		10 26	9 8	7 15	7 9	7 39	7 11	4 29	11 2	4 52																		
W.	18	0 27	10 47	9 9		11 7	9 10	8 1	8 1	8 21	8 3	5 14	11 9	5 37																		
Th.	19	1 17	11 28	9 10		11 47	9 10	8 41	8 4	9 0	8 3	5 58	12 1	6 17																		
F.	20	2 6	—	—		0 6	9 9	9 18	8 2	9 37	8 0	6 36	11 11	6 56																		
S.	21	2 55	0 26	9 9		0 47	9 8	9 55	7 10	10 11	7 7	7 16	11 5	7 34																		
S.	22	3 43	1 6	9 6		1 26	9 4	10 29	7 4	10 47	7 1	7 53	10 8	8 11																		
M.	23	4 32	1 46	9 2		2 7	9 0	11 6	6 9	11 28	6 5	8 29	9 10	8 48																		
Tu.	24	5 20	2 28	8 10		2 51	8 7	11 55	6 1	—	—	9 10	9 0	9 37																		
W.	25	6 10	3 14	8 4		3 38	8 2	0 24	5 8	0 56	5 5	10 4	8 3	10 35																		
Th.	26	6 59	4 6	8 0		4 42	7 10	1 31	5 3	2 15	5 1	11 13	7 9	11 53																		
F.	27	7 47	5 20	7 9		6 2	7 8	2 58	5 1	3 40	5 3	—	—	0 36																		
S.	28	8 35	6 45	7 8		7 24	7 8	4 19	5 5	4 52	5 8	1 19	7 8	1 57																		
Half Mean Spring Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.																	
Phases of the Moon.			Moon's Declination at Noon.																													
D. H. M.			M. D.		°		'		M. D.		°		'		M. D.		°		'		M. D.		°									
Full - - - - -			3		10		25		Afternoon.		1		20 N.		0		9		13 S.		28		17		10 S.		30		25		21	
Last Quarter -			11		10		46		Morning.		2		17		20		10		17		18		18		5		17		26		22	
New - - - - -			18		3		6		Morning.		3		13		55		11		20		15		19		0 N.		7		27		22	
First Quarter			25		0		34		Afternoon.		4		9		53		12		22		3		20		5		22		28		26	
			5		5		22				6		0		35		14		21		25		22		14		24					
In Perigee - -			15		11		0		Afternoon.		7		4 S.		17		15		18		55		23		17		49					
In Apogee - -			27		6		0		Afternoon.		8		9		3		16		15		10		24		20		20					

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 3 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 m.

## FEBRUARY, 1863.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age AT NOON.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time.	Height.	Time.	Height.		Time.	Height.	Time.	Height.		Time.	Height.	Time.	Height.		
L. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.		L. M. F. L.	H. M. F. L.	L. M. F. L.	H. M. F. L.		L. M. F. L.	H. M. F. L.	L. M. F. L.	H. M. F. L.	D.	
3 6	11 8	3 28	12 1		3 23	9 7	3 46	9 11		3 38	10 5	4 2	10 8	12.8	
3 46	12 6	4 4	12 11		4 7	10 3	4 27	10 6		4 25	11 0	4 47	11 3	13.8	
4 23	13 3	4 40	13 7		4 46	10 9	5 3	11 0		5 8	11 6	5 26	11 8	○	
4 55	13 11	5 11	14 3		5 20	11 3	5 37	11 5		5 43	11 10	5 58	12 0	15.8	
5 27	14 5	5 43	14 7		5 54	11 6	6 10	11 7		6 14	12 2	6 31	12 3	16.8	
6 0	14 8	6 17	14 8		6 27	11 8	6 43	11 8		6 48	12 4	7 4	12 4	17.8	
6 34	14 7	6 50	14 5		7 0	11 8	7 16	11 6		7 21	12 5	7 37	12 4	18.8	
7 8	14 3	7 27	14 0		7 33	11 5	7 51	11 3		7 54	12 3	8 11	12 2	19.8	
7 47	13 9	8 8	13 4		8 10	11 1	8 28	10 10		8 29	12 0	8 46	11 9	20.8	
8 30	12 11	8 53	12 5		8 46	10 6	9 6	10 3		9 3	11 6	9 22	11 3	21.8	
9 20	11 10	9 50	11 5		9 31	9 11	9 56	9 8		9 45	10 11	10 13	10 7	○	
0 26	11 1	11 8	11 0		10 27	9 5	11 7	9 3		10 49	10 3	11 27	10 1	123.8	
1 55	11 1	—	—		11 52	9 3	—	—		—	—	0 9	10 0	24.8	
0 41	11 4	1 22	11 9		0 39	9 4	1 24	9 8		0 52	10 1	1 34	10 4	25.8	
2 0	12 4	2 29	12 11		2 8	10 0	2 44	10 4		2 17	10 9	2 56	11 2	26.8	
2 58	13 6	3 25	14 1		3 16	10 10	3 44	11 3		3 31	11 7	4 2	12 0	27.8	
3 49	14 8	4 12	15 1		4 10	11 8	4 34	12 0		4 30	12 5	4 58	12 8	28.8	
4 34	15 6	4 54	15 10		4 57	12 3	5 20	12 5		5 20	12 11	5 42	13 1	●	
5 16	16 0	5 37	16 0		5 43	12 7	6 4	12 7		6 3	13 2	6 24	13 3	1.4	
5 57	15 11	6 18	15 9		6 24	12 6	6 44	12 5		6 44	13 2	7 5	13 1	2.4	
6 37	15 5	6 55	15 0		7 3	12 2	7 21	11 11		7 25	12 11	7 42	12 9	3.4	
7 15	14 6	7 33	14 0		7 39	11 7	7 57	11 3		8 0	12 6	8 16	12 2	4.4	
7 53	13 5	8 12	12 10		8 14	10 10	8 30	10 6		8 33	11 10	8 49	11 6	5.4	
8 33	12 2	8 55	11 5		8 48	10 0	9 8	9 7		9 5	11 1	9 22	10 8	6.4	
9 18	10 10	9 45	10 4		9 28	9 3	9 50	8 11		9 42	10 3	10 8	9 10	7	
0 21	9 11	11 1	9 8		10 21	8 7	11 0	8 4		10 44	9 6	11 21	9 2	8.4	
1 47	9 8	—	—		11 44	8 3	—	—		—	—	0 2	9 0	9.4	
0 31	9 9	1 9	10 0		0 29	8 4	1 9	8 6		0 42	9 1	1 20	9 3	10.4	
Mean Spring } 7ft. 5in. Range.					5ft. 10in.					6ft. 2in.					

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
13 51		9	14 29		17	14 17		25	13 21	
13 59		10	14 30		18	14 12		26	13 11	
14 5		11	14 30		19	14 7		27	13 0	
14 11		12	14 30		20	14 1		28	12 49	
14 16		13	14 29		21	13 54				
14 21		14	14 27		22	13 47				
14 24		15	14 24		23	13 39				
14 27		16	14 21		24	13 30				

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 8 m.

MARCH, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMO																												
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			A																									
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																								
			H. M.	H. M. F. I.	L.	H. M. F. I.	L.	H. M. F. I.	L.	H. M. F. I.	L.	H. M. F. I.	L.	H. M. F. I.	L.	H. M. F. I.	L.	H. M. F. I.	L.	H.																							
S.	1	9a21	0 48	13	0	1 22	13	8	1 56	12	1	2 35	11	8	8 37	9	9	9	9	9																							
M.	2	10 7	1 47	14	5	2 9	15	2	3 10	12	11	3 41	12	7	9 38	10	6	10	10	10																							
Tu.	3	10 52	2 28	15	11	2 47	16	8	4 6	13	10	4 30	13	5	10 23	11	3	11	11	11																							
W.	4	11 37	3 3	17	5	3 20	18	0	4 52	14	7	5 12	14	2	10 59	11	11	11	11	11																							
Th.	5	morn.	3 37	18	6	3 53	18	11	5 31	15	2	5 49	14	9	11 33	12	4	11	11	11																							
F.	6	0 21	4 9	19	2	4 27	19	5	6 6	15	7	6 25	15	2	—	—	—	—	—	—																							
S.	7	1 7	4 43	19	7	4 59	19	8	6 43	15	10	7 0	15	6	0 23	12	10	0	0	0																							
S.	8	1 55	5 16	19	7	5 34	19	4	7 14	15	8	7 30	15	5	0 59	12	11	1	1	1																							
M.	9	2 45	5 51	19	2	6 11	18	9	7 47	15	4	8 5	15	1	1 34	12	9	1	1	1																							
Tu.	10	3 39	6 29	18	4	6 50	17	8	8 24	14	11	8 43	14	8	2 11	12	6	2	2	2																							
W.	11	4 35	7 13	17	0	7 39	16	2	9 3	14	3	9 23	14	1	2 51	12	0	3	3	3																							
Th.	12	5 33	8 5	15	5	8 35	14	8	9 47	13	6	10 13	13	5	3 38	11	5	4	4	4																							
F.	13	6 32	9 11	14	3	9 53	14	0	10 42	12	8	11 18	12	10	4 32	10	8	5	5	5																							
S.	14	7 31	10 41	14	0	11 31	14	3	12 0	12	2	—	—	—	5 46	10	2	6	6	6																							
S.	15	8 28	—	—	0	15 14	9	0	47	12	11	1 34	12	6	7 20	10	3	8	8	8																							
M.	16	9 23	0 55	15	6	1 27	16	4	2 18	13	7	2 58	13	5	8 45	11	1	9	9	9																							
Tu.	17	10 15	1 53	17	2	2 19	18	1	3 34	14	7	4 3	14	3	9 47	11	11	10	10	10																							
W.	18	11 6	2 40	18	9	3 2	19	5	4 30	15	5	4 54	15	8	10 36	12	7	11	11	11																							
Th.	19	11 55	3 22	19	11	3 42	20	2	5 18	16	0	5 39	15	11	11 18	13	1	12	12	12																							
F.	20	0a44	4 120	3	4 22	20	3	6 0	16	4	6 21	16	0	11 58	13	3	—	—	—	—																							
S.	21	1 32	4 41	20	1	4 58	19	10	6 40	16	2	6 59	15	9	0 18	13	3	0	0	0																							
S.	22	2 22	5 16	19	6	5 34	19	0	7 13	15	8	7 29	15	4	0 58	13	0	1	1	1																							
M.	23	3 11	5 50	18	6	6 8	17	11	7 46	15	1	8 2	14	9	1 34	12	7	1	1	1																							
Tu.	24	4 1	6 26	17	3	6 43	16	6	8 19	14	3	8 34	14	0	2 9	12	1	2	2	2																							
W.	25	4 51	7 2	15	8	7 23	14	10	8 49	13	4	9 5	13	3	2 44	11	5	3	3	3																							
Th.	26	5 40	7 45	14	1	8 10	13	5	9 24	12	5	9 43	12	5	3 23	10	9	3	3	3																							
F.	27	6 28	8 39	12	10	9 12	12	5	10 5	11	6	10 35	11	9	4 7	10	1	4	4	4																							
S.	28	7 14	9 51	12	3	10 36	12	3	11 5	10	10	11 46	11	6	5 6	9	5	5	5	5																							
S.	29	8 0	11 19	12	6	11 59	12	11	—	—	—	0 30	10	11	6 26	9	3	7	7	7																							
M.	30	8 45	—	—	0	34	13	6	1 10	12	0	1 49	11	8	7 46	9	8	8	8	8																							
Tu.	31	9 30	1 4	14	2	1 31	14	11	2 28	12	9	2 58	12	6	8 54	10	5	9	9	9																							
Half Mean Spring } Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.																												
Phases of the Moon.																						Moon's Declination at Noon.																					
D. H. M.																						M.D. ° ' M.D.																					

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 4



MARCH, 1863.

WEEK DAY.	MONTH DAY.	DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	
S. M.	1	8 3 13 11	8 38 14 6	9 49 12 7	10 25 13 0	11 12 15 0	11 50 15 4	11 4						
Tu.	2	9 2 15 1	9 24 15 8	10 58 13 4	11 22 13 9	—	0 24 15 9	12 4						
W.	3	9 46 16 3	10 6 16 9	11 42 14 2	—	0 50 16 2	1 11 16 7	13 4						
Th.	4	10 25 17 3	10 44 17 9	0 1 14 7	0 19 14 11	1 32 17 1	1 51 17 6	14 4						
F.	5	11 1 18 1	11 20 18 5	0 36 15 3	0 53 15 6	2 8 17 11	2 25 18 3	0						
S.	6	11 38 18 9	11 56 18 11	1 10 15 10	1 26 16 1	2 41 18 8	2 57 18 11	16 4						
S.	7	—	0 14 19 1	1 41 16 3	1 58 16 4	3 13 19 2	3 29 19 4	17 4						
S. M.	8	0 33 19 2	0 51 19 2	2 13 16 4	2 30 16 4	3 43 19 6	4 0 19 7	18 4						
Tu.	9	1 11 19 0	1 31 18 10	2 47 16 4	3 4 16 3	4 17 19 6	4 37 19 5	19 4						
W.	10	1 51 18 7	2 11 18 3	3 21 16 1	3 40 15 10	4 54 19 3	5 12 19 12	20 4						
Th.	11	2 32 17 10	2 55 17 4	3 59 15 6	4 20 15 2	5 31 18 9	5 52 18 5	21 4						
F.	12	3 19 16 9	3 44 16 2	4 44 14 9	5 9 14 4	6 15 18 0	6 39 17 6	0						
S.	13	4 13 15 7	4 44 15 0	5 37 14 0	6 10 13 7	7 7 17 1	7 39 16 8	23 4						
S.	14	5 21 14 8	6 2 14 7	6 49 13 3	7 33 13 2	8 16 16 4	9 0 16 12	24 4						
S. M.	15	6 45 14 10	7 28 15 4	8 23 13 3	9 11 13 6	9 48 16 0	10 34 16 2	25 4						
Tu.	16	8 10 16 0	8 42 16 8	9 52 13 11	10 30 14 5	11 20 16 5	11 59 16 11	26 4						
W.	17	9 10 17 4	9 37 17 11	11 1 14 10	11 27 15 4	—	0 29 17 4	27 4						
Th.	18	10 1 18 6	10 24 18 11	11 52 15 9	—	0 55 17 10	1 20 18 5	28 4						
F.	19	10 46 19 3	11 8 19 6	0 13 16 1	0 35 16 5	1 45 18 10	2 5 19 2	0						
S.	20	11 30 19 7	11 51 19 8	0 55 16 7	1 15 16 9	2 25 19 6	2 46 19 9	0 9						
S.	21	—	0 13 19 6	1 33 16 10	1 54 16 9	3 4 19 10	3 23 19 11	1 9						
S. M.	22	0 32 19 4	0 51 19 1	2 12 16 8	2 30 16 6	3 41 19 10	3 59 19 8	2 9						
Tu.	23	1 11 18 9	1 30 18 4	2 47 16 3	3 4 16 0	4 17 19 6	4 34 19 3	3 9						
W.	24	1 48 17 11	2 7 17 5	3 20 15 8	3 37 15 4	4 52 18 10	5 8 18 6	4 9						
Th.	25	2 25 16 10	2 44 16 3	3 56 14 11	4 13 14 6	5 26 18 1	5 45 17 8	5 9						
F.	26	3 4 15 8	3 24 15 1	4 33 14 0	4 53 13 7	6 5 17 2	6 24 16 8	6 9						
S.	27	3 48 14 7	4 14 14 0	5 17 13 3	5 44 12 10	6 47 16 3	7 14 15 10	0						
S.	28	4 43 13 6	5 17 13 3	6 15 12 6	6 51 12 3	7 42 15 6	8 19 15 3	8 9						
S. M.	29	5 55 13 2	6 34 13 5	7 32 12 2	8 18 12 3	9 2 15 0	9 44 14 11	9 9						
Tu.	30	7 12 13 9	7 48 14 4	8 59 12 6	9 37 12 10	10 23 15 1	11 3 15 4	10 9						
Tu.	31	8 19 14 11	8 46 15 6	10 11 13 3	10 40 13 8	11 38 15 7	—	11 9						
Half Mean Spring } Range.		9ft. 4in.		8ft. 0in.		9ft. 7in.								

Half Mean Spring }  
Range. } 9ft. 4in.

8ft. 0in.

9ft. 7in.

Equation of Time at Noon.

M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
1	12 38		9	10 48		17	8 36		25	6 11	
2	12 26		10	10 32		18	8 18		26	5 53	
3	12 13		11	10 16		19	8 0		27	5 35	
4	12 0		12	10 0		20	7 43		28	5 16	
5	11 46		13	9 44		21	7 25		29	4 58	
6	11 32		14	9 27		22	7 6		30	4 39	
7	11 18		15	9 10		23	6 48		31	4 21	
8	11 3		16	8 53		24	6 30				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. SHEERNESS subtract 3 m. LONDON 0 m.



## MARCH, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.												
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.									
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.								
		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.								
Mo.	1	9 21	8 56	9 5	9 32	9 7	3 18	15 6	3 53	16 1	0 11	10 3	0 45	10													
M.	2	10 7	10 5	9 10	10 31	10 2	4 28	16 9	4 50	17 4	1 17	11 2	1 41	11													
Tu.	3	10 52	10 53	10 5	11 12	10 8	5 12	18 0	5 30	18 7	2 2	12 1	2 24	12													
W.	4	11 37	11 31	10 11	11 49	11 2	5 48	19 1	6 5	19 7	2 43	12 10	3 1	13													
Th.	5	morn.	—	—	0 6	11 4	6 22	19 11	6 40	20 4	3 18	13 7	3 33	13													
F.	6	0 21	0 23	11 6	0 39	11 7	6 57	20 8	7 13	21 0	3 49	14 2	4 5	14													
S.	7	1 7	0 54	11 8	1 11	11 9	7 30	21 2	7 47	21 3	4 21	14 7	4 37	14													
Mo.	8	1 55	1 27	11 9	1 45	11 8	8 4	21 4	8 20	21 4	4 54	14 9	5 10	14													
M.	9	2 45	2 2	11 7	2 20	11 6	8 38	21 2	8 56	20 11	5 28	14 6	5 46	14													
Tu.	10	3 39	2 38	11 5	2 57	11 3	9 15	20 6	9 35	20 0	6 6	14 0	6 26	13													
W.	11	4 35	3 17	11 1	3 38	10 10	9 56	19 6	10 19	18 11	6 49	13 3	7 15	12													
Th.	12	5 33	4 0	10 8	4 24	10 5	10 45	18 4	11 16	17 9	7 41	12 5	8 9	12													
F.	13	6 32	4 50	10 2	5 21	10 0	11 53	17 2	—	—	8 42	11 7	9 20	11													
S.	14	7 31	5 57	9 10	6 40	9 9	0 34	16 8	1 16	16 6	10 4	11 1	10 51	11													
Mo.	15	8 28	7 31	9 10	8 19	10 0	1 59	16 6	2 42	16 11	11 36	11 4	—	—													
M.	16	9 23	8 59	10 3	9 38	10 7	3 21	17 6	4 0	18 4	0 14	11 9	0 50	12													
Tu.	17	10 15	10 10	10 10	10 38	11 2	4 30	19 1	4 56	19 9	1 20	12 10	1 48	13													
W.	18	11 6	11 3	11 5	11 25	11 8	5 20	20 5	5 42	20 11	2 15	13 9	2 37	14													
Th.	19	11 55	11 48	11 11	—	—	6 4	21 3	6 25	21 7	2 59	14 6	3 19	14													
F.	20	0 44	0 8	12 0	0 28	12 1	6 45	21 9	7 5	21 11	3 37	15 0	3 57	15													
S.	21	1 32	0 46	12 1	1 6	12 0	7 25	21 11	7 45	21 9	4 16	15 2	4 35	15													
Mo.	22	2 22	1 27	11 11	1 44	11 9	8 3	21 6	8 20	21 3	4 53	14 11	5 10	14													
M.	23	3 11	2 2	11 7	2 20	11 5	8 38	20 10	8 55	20 4	5 28	14 3	5 46	13													
Tu.	24	4 1	2 38	11 2	2 55	10 11	9 13	19 9	9 31	19 1	6 4	13 5	6 23	12													
W.	25	4 51	3 13	10 8	3 31	10 5	9 49	18 5	10 8	17 10	6 43	12 6	7 4	12													
Th.	26	5 40	3 49	10 2	4 9	9 11	10 29	17 2	10 55	16 7	7 25	11 7	7 49	11													
F.	27	6 28	4 30	9 8	4 56	9 6	11 25	16 0	12 0	15 6	8 16	10 9	8 47	10													
S.	28	7 14	5 25	9 3	5 58	9 2	—	—	0 36	15 2	9 22	10 2	10 3	10													
Mo.	29	8 0	6 39	9 1	7 26	9 2	1 13	14 11	1 53	15 0	10 45	10 1	11 24	10													
M.	30	8 45	8 7	9 4	8 45	9 6	2 31	15 4	3 7	15 10	12 0	10 7	—	—													
Tu.	31	9 30	9 18	9 9	9 47	10 0	3 39	16 6	4 9	17 2	0 30	11 0	0 59	11													
Half Mean Spring Range.			5 ft 9 in.						10 ft. 5 in.						7 ft. 2 in.												
Phases of the Moon.												Moon's Declination at Noon.															
D. H. M.												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'				
Full - - - - -												5	2	46	Afternoon.	1	18 N.	6	9	16 S.	16	17	7 S.	15	25	22 N.	
Last Quarter -												12	6	55	Afternoon.	2	14	57	10	19	26	18	2	2	26	21	5
New - - - - -												19	2	37	Afternoon.	3	11	7	11	21	29	19	3 N.	13	27	20	4
First Quarter -												27	8	58	Morning.	4	6	46	12	22	15	20	8	12	28	18	4
												5	2	2		13	21	36	21	12	39	29	15	5			
In Perigee - -												15	7	0	Morning.	6	2 S.	52	14	19	35	22	16	24	30	12	2
In Apogee - -												27	2	0	Afternoon.	7	7	43	15	16	20	23	19	17	31	8	1
												8	12	16		16	12	7	24	21	11						

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 HARWICH subtract 5 m.      HULL add 1 m.      SUNDERLAND add 5 m.

## MARCH, 1863.

WEEK DAY.	MONTH DAY.	NORTH SHIELDS.				LEITH.				THURSO.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.	
M.	1	0 25 9 4	0 59 9 8	11 52 12 2	— —	5 54 8 9	6 26 9 3	11 4						
Tu.	2	1 29 10 0	1 50 10 5	0 24 12 7	0 46 13 1	6 47 9 10	7 5 10 5	12 4						
W.	3	2 11 10 10	2 29 11 3	1 5 13 7	1 24 14 1	7 21 11 0	7 37 11 6	13 4						
Th.	4	2 47 11 9	3 3 12 2	1 42 14 8	1 59 15 2	7 51 12 1	8 6 12 6	14 4						
F.	5	3 19 12 6	3 34 12 10	2 16 15 6	2 32 15 11	8 20 12 11	8 36 13 2	0						
S.	6	3 49 13 1	4 5 13 4	2 48 16 2	3 3 16 5	8 51 13 5	9 6 13 6	16 4						
S.	7	4 22 13 5	4 38 13 6	3 18 16 7	3 33 16 7	9 21 13 7	9 40 13 7	17 4						
S.	8	4 56 13 5	5 13 13 4	3 51 16 7	4 8 16 5	9 58 13 5	10 16 13 3	18 4						
M.	9	5 31 13 3	5 50 13 1	4 26 16 3	4 45 16 11	10 35 13 1	10 56 12 9	19 4						
Tu.	10	6 10 12 10	6 30 12 6	5 5 15 10	5 25 15 6	11 16 12 4	11 39 11 11	20 4						
W.	11	6 52 12 2	7 16 11 10	5 47 15 2	6 13 14 8	— —	0 5 11 6	21 4						
Th.	12	7 44 11 4	8 14 10 10	6 40 14 1	7 8 13 8	0 32 11 0	1 0 10 6	22 4						
F.	13	8 49 10 4	9 30 10 1	7 44 13 2	8 24 12 10	1 34 10 1	2 15 9 9	23 4						
S.	14	10 17 10 0	11 3 10 1	9 9 12 8	9 58 12 9	3 1 9 7	3 54 9 7	24 4						
S.	15	11 49 10 5	— —	10 42 13 0	11 20 13 4	4 42 9 9	5 22 10 0	25 4						
M.	16	0 27 10 9	1 3 11 2	11 57 13 10	— —	5 59 10 6	6 27 11 1	26 4						
Tu.	17	1 31 11 8	1 55 12 1	0 25 14 5	0 50 15 0	6 50 11 9	7 11 12 5	27 4						
W.	18	2 19 12 7	2 40 13 0	1 14 15 7	1 36 16 1	7 29 13 0	7 48 13 6	28 4						
Th.	19	3 1 13 5	3 20 13 8	1 58 16 7	2 18 16 11	8 6 13 11	8 25 14 1	29 4						
F.	20	3 38 13 11	3 57 14 0	2 37 17 1	2 55 17 2	8 43 14 2	9 1 14 1	30 4						
S.	21	4 17 14 0	4 37 13 10	3 13 17 2	3 32 17 0	9 21 13 11	9 39 13 8	31 4						
S.	22	4 55 13 7	5 13 13 4	3 50 16 9	4 8 16 5	9 58 13 5	10 16 13 0	2 9						
M.	23	5 32 13 0	5 50 12 7	4 26 16 0	4 45 15 8	10 35 12 7	10 53 12 1	3 9						
Tu.	24	6 8 12 3	6 26 11 10	5 3 15 3	5 21 14 9	11 13 11 7	11 33 11 1	4 9						
W.	25	6 45 11 5	7 5 11 0	5 41 14 4	6 2 13 9	11 54 10 7	— —	5 9						
Th.	26	7 27 10 6	7 53 10 0	6 24 13 3	6 48 12 9	0 15 10 1	0 40 9 7	6 9						
F.	27	8 22 9 7	8 56 9 3	7 17 12 4	7 50 11 11	1 8 9 3	1 41 8 10	7 9						
S.	28	9 33 9 0	10 15 9 0	8 26 11 8	9 8 11 6	2 17 8 7	3 1 8 5	8 9						
S.	29	10 57 9 1	11 37 9 3	9 52 11 7	10 30 11 9	3 49 8 5	4 30 8 7	9 9						
M.	30	— —	0 14 9 7	11 7 12 1	11 37 12 6	5 8 8 9	5 39 9 1	10 9						
Tu.	31	0 44 9 11	1 11 10 4	— —	0 6 12 11	6 7 9 7	6 31 10 2	11 9						
Half Mean Spring Range.		6ft. 8in.				8ft. 2in.				6ft. 7in.				

## Equation of Time at Noon.

M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
1	12 38	Sub.	9	10 48	Sub.	17	8 36	Sub.	25	6 11	Sub.
2	12 26		10	10 32		18	8 18		26	5 53	
3	12 13		11	10 16		19	8 0		27	5 35	
4	12 0		12	10 0		20	7 43		28	5 16	
5	11 46		13	9 44		21	7 25		29	4 58	
6	11 32		14	9 27		22	7 6		30	4 39	
7	11 18		15	9 10		23	6 48		31	4 21	
8	11 3		16	8 53		24	6 30				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 NORTH SHIELDS add 6 m.      LEITH add 12 m.      THURSO add 14 m.

MARCH, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.																												
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																									
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																								
		H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.	H. M.	F. I.																								
S.	1	9a 21	9	0	8	0	9 34	8	2	8 29	19	6	9	1 20	3	2 52	14	9	3 28	15	0																						
M.	2	10 7	10	0	8	5	10 22	8	7	9 25	21	1	9	4 52	11	3 56	16	3	4 20	17	0																						
Tu.	3	10 52	10	43	8	10	11 3	9	0	10 3	22	9	10	21 23	5	4 43	17	10	5 5	18	0																						
W.	4	11 37	11	22	9	2	11 41	9	3	10 37	24	1	10	55 24	8	5 25	19	2	5 45	19	0																						
Th.	5	morn.	11	59	9	5	—	—	11	11 25	2	11	28 25	8	6	3	20	3	6 20	20	0																						
F.	6	0 21	0	16	9	7	0 33	9	9	11 45	26	1	—	—	6	36	21	1	6 53	21	0																						
S.	7	1 7	0	50	9	10	1 7	9	11	0 22	6	4	0	18 26	6	7 9	21	6	7 26	21	0																						
S.	8	1 55	1	25	9	11	1 42	9	11	0 36	26	8	0	53 26	7	7 43	21	6	8 0	21	0																						
M.	9	2 45	2	0	9	11	2 18	9	10	1 11	26	5	1	28 26	0	8 18	21	0	8 37	20	0																						
Tu.	10	3 39	2	37	9	9	2 55	9	7	1 46	25	7	2	5 24	11	8 57	20	2	9 18	19	0																						
W.	11	4 35	3	15	9	5	3 37	9	3	2 26	24	3	2	48 23	7	9 39	18	11	10 1	18	0																						
Th.	12	5 33	4	1	9	1	4 27	8	11	3 12	22	9	3	38 22	0	10 25	17	7	10 51	16	0																						
F.	13	6 32	4	56	8	9	5 32	8	6	4 10	21	3	4	48 20	7	11 20	16	2	11 57	15	0																						
S.	14	7 31	6	12	8	4	6 58	8	3	5 33	20	3	6	25 20	4	—	—	—	0 39	15	0																						
S.	15	8 28	7	45	8	4	8 27	8	6	7 15	20	9	7	55 21	6	1 29	15	11	2 17	16	0																						
M.	16	9 23	9	7	8	9	9 40	9	0	8 35	22	5	9	4 23	3	3 0	17	4	3 35	18	0																						
Tu.	17	10 15	10	8	9	3	10 34	9	5	9 29	24	3	9	54 25	1	4 6	19	1	4 34	19	0																						
W.	18	11 6	10	58	9	7	11 21	9	9	10 15	25	9	10	36 26	4	5 0	20	8	5 25	21	0																						
Th.	19	11 55	11	43	9	11	—	—	10	57 26	9	11	11 17	27	1	5 48	21	8	6 8	21	0																						
F.	20	ca 44	0	4	10	0	0 25	10	1	11 37	27	3	11	57 27	4	6 28	22	1	6 48	22	0																						
S.	21	1 32	0	45	10	1	1 6	10	1	—	—	—	0	17 27	2	7 7	22	0	7 25	21	0																						
S.	22	2 22	1	25	10	0	1 42	9	11	0 35	26	11	0	53 26	6	7 43	21	5	8 0	21	0																						
M.	23	3 11	2	0	9	9	2 17	9	8	1 11	26	0	1	28 25	3	8 18	20	5	8 36	19	0																						
Tu.	24	4 1	2	34	9	6	2 51	9	3	1 44	24	6	2	2 23	9	8 54	19	1	9 11	18	0																						
W.	25	4 51	3	8	9	1	3 26	8	11	2 19	22	11	2	37 22	2	9 28	17	8	9 46	16	0																						
Th.	26	5 40	3	46	8	8	4 7	8	6	2 57	21	4	3	18 20	6	10 5	16	3	10 28	15	0																						
F.	27	6 28	4	32	8	4	5 0	8	1	3 44	19	9	4	15 19	1	10 51	14	11	11 19	14	0																						
S.	28	7 14	5	32	7	11	6 10	7	10	4 52	18	6	5	32 18	4	11 53	14	1	—	—	0																						
S.	29	8 0	6	52	7	9	7 33	7	9	6 19	18	5	7	3 18	10	0 33	14	0	1 16	14	0																						
M.	30	8 45	8	11	7	11	8 46	8	2	7 41	19	4	8	14 20	1	1 59	14	7	2 37	15	0																						
Tu.	31	9 30	9	16	8	4	9 44	8	7	8 43	20	10	9	8 21	9	3 10	16	0	3 39	16	0																						
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.																												
Phases of the Moon.																						Moon's Declination at Noon.																					
D. H. M.																						M.D. ° ' "																					
Full - - - - 5 2 46 Afternoon.																						1 18 N. 6 9 16 S. 16 17 7 S. 15 25 22 N. 4																					
Last Quarter - 12 6 55 Afternoon.																						2 14 57 10 19 26 18 2 2 26 21 5																					
New - - - - 19 2 37 Afternoon.																						3 11 7 11 21 29 19 3 N. 13 27 20 4																					
First Quarter - 27 8 58 Morning.																						4 6 46 12 22 15 20 8 12 28 18 4																					
																						5 2 2 13 21 36 21 12 39 29 15 5																					
In Perigee - - 15 7 0 Morning.																						6 2 S. 52 14 19 35 22 16 24 30 12 2																					
In Apogee - - 27 2 0 Afternoon.																						7 7 43 15 16 20 23 19 17 31 8 1																					
																						8 12 16 16 12 7 24 21 11																					

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

## MARCH, 1863.

MONTH DAY.	WESTON-SUPER-MARE.								HOLYHEAD.								KINGSTOWN.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	D.						
1	3 24 27 4		4 2 28 4		7 26 12 2		7 57 12 7		8 14 8 9		8 47 9 0		11 4												
2	4 34 29 6		4 59 30 9		8 21 13 1		8 41 13 7		9 13 9 3		9 35 9 6		12 4												
3	5 24 32 0		5 46 33 2		8 59 14 0		9 16 14 6		9 57 9 9		10 16 10 0		13 4												
4	6 6 34 3		6 26 35 1		9 32 14 11		9 49 15 3		10 32 10 3		10 47 10 6		14 4												
5	6 45 35 11		7 2 36 7		10 5 15 7		10 21 15 10		11 2 10 8		11 18 10 11		0												
6	7 19 37 3		7 36 37 9		10 36 16 1		10 50 16 3		11 33 11 0		11 49 11 1		16 4												
7	7 52 38 1		8 9 38 2		11 5 16 4		11 21 16 4		—		—		17 4												
8	8 26 38 1		8 43 37 11		11 38 16 3		11 57 16 2		0 24 11 1		0 42 11 0		18 4												
9	9 0 37 7		9 18 37 1		—		0 16 16 0		1 0 10 11		1 19 10 10		19 4												
10	9 35 36 5		9 53 35 5		0 37 15 8		0 58 15 4		1 40 10 8		1 59 10 5		20 4												
11	10 12 34 4		10 31 33 2		1 21 14 11		1 46 14 6		2 21 10 2		2 46 10 0		21 4												
12	10 52 32 0		11 18 30 9		2 13 14 0		2 41 13 7		3 12 9 9		3 40 9 6		22 4												
13	11 52 29 9		—		3 15 13 2		3 56 12 10		4 14 9 3		4 54 9 0		23 4												
14	0 32 29 1		1 17 29 0		4 42 12 8		5 31 12 9		5 36 8 11		6 20 9 0		24 4												
15	2 5 29 5		2 50 30 4		6 16 13 1		6 54 13 5		7 3 9 2		7 41 9 5		25 4												
16	3 34 31 5		4 12 32 8		7 31 13 11		8 0 14 5		8 20 9 8		8 52 10 0		26 4												
17	4 44 34 0		5 15 35 5		8 25 15 0		8 49 15 6		9 21 10 3		9 48 10 7		27 4												
18	5 41 36 7		6 6 37 6		9 10 15 11		9 30 16 3		10 9 10 10		10 29 11 4		28 4												
19	6 30 38 3		6 51 38 8		9 50 16 7		10 10 16 9		10 48 11 3		11 6 11 4		29 4												
20	7 11 38 11		7 32 39 2		10 28 16 10		10 45 16 10		11 25 11 5		11 44 11 5		0 9												
21	7 51 38 11		8 9 38 7		11 3 16 8		11 20 16 6		—		—		1 9												
22	8 26 38 1		8 43 37 4		11 38 16 3		11 57 15 11		0 23 11 2		0 42 11 0		2 9												
23	8 59 36 7		9 15 35 8		—		0 16 15 6		1 0 10 10		1 19 10 7		3 9												
24	9 31 34 7		9 46 33 6		0 35 15 1		0 55 14 7		1 37 10 3		1 56 10 0		4 9												
25	10 13 32 4		10 16 31 1		1 15 14 1		1 35 13 7		2 15 9 9		2 35 9 6		5 9												
26	10 33 29 11		10 55 28 9		1 57 13 2		2 21 12 8		2 56 9 3		3 20 9 0		6 9												
27	11 20 27 7		11 52 26 9		2 49 12 3		3 22 11 11		3 47 8 9		4 20 8 6		7 9												
28	—		0 29 26 3		3 58 11 8		4 41 11 6		4 56 8 4		5 33 8 3		8 9												
29	1 12 26 3		1 54 26 7		5 25 11 8		6 4 11 10		6 14 8 4		6 51 8 6		9 9												
30	2 33 27 2		3 9 28 1		6 41 12 2		7 11 12 6		7 28 8 8		7 59 8 11		10 9												
31	3 44 29 2		4 15 30 4		7 39 13 0		8 4 13 6		8 29 9 2		8 56 9 5		11 9												
Mean Spring Range.				18ft. 7in.				8ft. 0in.				5ft. 6in.													

If Mean Spring }  
Range. } 18 ft. 7 in.

8 ft. 0 in.

5 ft. 6 in.

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
12 38		9	10 48		17	8 36		25	6 11	
12 26		10	10 32		18	8 18		26	5 53	
12 13		11	10 16		19	8 0		27	5 35	
12 0		12	10 0		20	7 43		28	5 16	
11 46		13	9 44		21	7 25		29	4 58	
11 32		14	9 27		22	7 6		30	4 39	
11 18		15	9 10		23	6 48		31	4 21	
11 3		16	8 53		24	6 30				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## TIDE TABLES FOR THE

MARCH, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.								LONDONDERRY.								SLIGO BAY.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.			
			Time. H. M.	H. M.	F. I.	Height. H. M. F. I.	Time. H. M.	H. M.	F. I.	Height. H. M. F. I.	Time. H. M.	H. M.	F. I.	Height. H. M. F. I.	Time. H. M.	H. M.	F. I.	Height. H. M. F. I.	Time. H. M.	H. M.	F. I.	Height. H. M. F. I.				
S.	1	9 21	8 0	7 9	8 32	8 0	5 21	5 10	5 47	6 0	2 32	8 0	3 4	8 5												
M.	2	10 7	8 55	8 3	9 14	8 6	6 7	6 2	6 25	6 5	3 26	8 9	3 45	9 2												
Tu.	3	10 52	9 33	8 8	9 51	8 11	6 43	6 8	7 2	6 11	4 1	9 6	4 18	9 11												
W.	4	11 37	10 8	9 1	10 25	9 3	7 20	7 1	7 38	7 3	4 34	10 3	4 51	10 7												
Th.	5	morn.	10 41	9 4	10 57	9 5	7 55	7 5	8 11	7 7	5 8	10 10	5 25	11 1												
F.	6	0 21	11 12	9 6	11 27	9 6	8 26	7 9	8 41	7 10	5 42	11 4	5 58	11 5												
S.	7	1 7	11 42	9 7	11 59	9 7	8 55	7 11	9 11	7 10	6 13	11 6	6 29	11 5												
S.	8	1 55	—	—	0 17	9 6	9 27	7 9	9 44	7 8	6 47	11 4	7 5	11 2												
M.	9	2 45	0 36	9 6	0 55	9 5	10 1	7 6	10 19	7 4	7 24	10 11	7 43	10 8												
Tu.	10	3 39	1 16	9 4	1 37	9 3	10 38	7 2	10 59	6 11	8 3	10 4	8 23	10 0												
W.	11	4 35	2 0	9 1	2 27	8 11	11 27	6 7	11 59	6 3	8 47	9 8	9 15	9 3												
Th.	12	5 33	2 55	8 9	3 23	8 6	—	—	0 36	5 11	9 47	8 11	10 24	8 8												
F.	13	6 32	3 57	8 4	4 35	8 3	1 18	5 9	2 6	5 8	11 5	8 6	11 50	8 5												
S.	14	7 31	5 17	8 2	6 1	8 1	2 54	5 8	3 39	5 11	—	—	0 35	8 6												
S.	15	8 28	6 47	8 2	7 27	8 3	4 20	6 2	4 52	6 5	1 21	8 8	2 0	8 11												
M.	16	9 23	8 5	8 5	8 34	8 8	5 22	6 8	5 46	6 11	2 38	9 4	3 5	9 5												
Tu.	17	10 15	8 59	9 0	9 24	9 3	6 10	7 2	6 34	7 5	3 29	10 2	3 51	10 1												
W.	18	11 6	9 46	9 5	10 7	9 7	6 57	7 8	7 19	7 10	4 12	11 0	4 33	11 4												
Th.	19	11 55	10 26	9 8	10 45	9 9	7 40	8 0	8 0	8 1	4 53	11 7	5 13	11 5												
F.	20	0 44	11 4	9 9	11 23	9 9	8 18	8 2	8 36	8 2	5 34	11 10	5 53	11 10												
S.	21	1 32	11 41	9 8	11 59	9 7	8 53	8 1	9 10	7 11	6 11	11 9	6 28	11 1												
S.	22	2 22	—	—	0 17	9 6	9 27	7 9	9 44	7 6	6 47	11 4	7 5	11 1												
M.	23	3 11	0 36	9 5	0 55	9 3	10 0	7 3	10 16	7 0	7 23	10 7	7 40	10 1												
Tu.	24	4 1	1 13	9 2	1 33	9 0	10 34	6 9	10 53	6 5	7 58	9 10	8 16	9 1												
W.	25	4 51	1 54	8 9	2 16	8 7	11 16	6 2	11 43	5 10	8 36	9 0	8 59	8 1												
Th.	26	5 40	2 39	8 5	3 3	8 2	—	—	0 14	5 6	9 26	8 4	9 56	8 1												
F.	27	6 28	3 31	8 0	4 2	7 11	0 49	5 3	1 28	5 10	10 31	7 9	11 8	7 1												
S.	28	7 14	4 37	7 9	5 15	7 8	2 10	5 0	2 52	5 11	11 48	7 7	—	—												
S.	29	8 0	5 55	7 8	6 35	7 8	3 33	5 3	4 9	5 6	0 29	7 8	1 9	7 1												
M.	30	8 45	7 13	7 9	7 45	7 11	4 41	5 9	5 7	5 11	1 46	7 11	2 18	8 1												
Tu.	31	9 30	8 14	8 1	8 38	8 4	5 30	6 2	5 50	6 5	2 46	8 8	3 9	9 1												
Half Mean Spring Range.			4 ft. 9 in.								3 ft. 10 in.								5 ft. 7 in.							
Phases of the Moon.											Moon's Declination at Noon.															
D. H. M.											M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	
Full - - - - 5 2 46 Afternoon.											1	18 N.	6	9	16 S.	16	17	7 S.	15	25	22 N.					
Last Quarter - 12 6 55 Afternoon.											2	14	57	10	19	26	18	2	2	26	21	5				
New - - - - 19 2 37 Afternoon.											3	11	7	11	21	29	19	3 N.	13	27	20	4				
First Quarter 27 8 58 Morning.											4	6	46	12	22	15	20	8	12	28	18	4				
											5	2	2	13	21	36	21	12	39	29	15	5				
In Perigee - - 15 7 0 Morning.											6	2 S.	52	14	19	35	22	16	24	30	12	2				
In Apogee - - 27 2 0 Afternoon.											7	7	43	15	16	20	23	19	17	31	8	1				
											8	12	16	16	12	7	24	21	11							

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—

BELFAST subtract 2 m.

LONDONDERRY add 4 m.

SLIGO BAY add 9 m.

## MARCH, 1863.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	D.		
1 44 10 5		2 15 10 11		1 48 8 9	2 24 9 0		1 57 9 5		2 33 9 9		11.4				
2 38 11 5		2 59 11 11		2 52 9 4	3 15 9 9		3 2 10 2		3 29 10 6		12.4				
3 19 12 5		3 38 12 11		3 37 10 1	3 57 10 6		3 53 10 11		4 15 11 3		13.4				
3 55 13 4		4 11 13 9		4 16 10 10	4 34 11 1		4 35 11 7		4 56 11 10		14.4				
4 28 14 2		4 44 14 6		4 51 11 4	5 8 11 7		5 14 12 1		5 31 12 3		15.4				
5 0 14 10		5 16 15 1		5 25 11 10	5 43 11 11		5 47 12 5		6 3 12 7		16.4				
5 32 15 2		5 50 15 3		6 0 12 0	6 18 12 1		6 19 12 8		6 37 12 9		17.4				
6 8 15 2		6 26 15 0		6 34 12 0	6 52 11 11		6 55 12 9		7 14 12 8		18.4				
6 44 14 10		7 4 14 6		7 10 11 9	7 29 11 7		7 31 12 7		7 50 12 5		19.4				
7 24 14 2		7 46 13 9		7 48 11 4	8 8 11 0		8 8 12 3		8 27 12 0		20.4				
8 11 13 2		8 37 12 7		8 30 10 9	8 52 10 4		8 48 11 8		9 9 11 4		21.4				
9 5 12 0		9 36 11 6		9 17 10 0	9 43 9 8		9 31 11 0		9 59 10 8		22.4				
10 14 11 1		10 58 10 11		10 16 9 5	10 57 9 3		10 37 10 4		11 18 10 1		23.4				
11 45 11 1		—		11 43 9 2	—		—		0 1 9 11		24.4				
0 33 11 3		1 13 11 8		0 31 9 4	1 14 9 7		0 44 10 1		1 24 10 4		25.4				
1 49 12 3		2 17 12 10		1 56 10 0	2 31 10 4		2 4 10 9		2 43 11 2		26.4				
2 44 13 5		3 10 14 0		3 0 10 9	3 28 11 2		3 14 11 7		3 44 11 11		27.4				
3 32 14 6		3 53 14 10		3 52 11 6	4 15 11 10		4 10 12 3		4 36 12 7		28.4				
4 13 15 3		4 33 15 6		4 36 12 1	4 56 12 3		4 59 12 9		5 19 12 10		29.4				
4 51 15 8		5 11 15 8		5 17 12 4	5 38 12 4		5 39 12 11		5 59 13 0		30.4				
5 31 15 7		5 50 15 5		5 58 12 3	6 17 12 2		6 19 12 11		6 37 12 10		31.4				
6 8 15 1		6 26 14 9		6 35 12 0	6 52 11 9		6 55 12 8		7 14 12 6		32.4				
6 44 14 4		7 2 13 10		7 10 11 5	7 27 11 1		7 31 12 3		7 47 12 0		33.4				
7 21 13 4		7 40 12 10		7 44 10 9	8 1 10 5		8 4 11 9		8 20 11 5		34.4				
8 0 12 3		8 21 11 7		8 18 10 1	8 36 9 8		8 37 11 1		8 53 10 8		35.4				
8 45 11 0		9 10 10 6		8 57 9 4	9 20 9 0		9 11 10 4		9 34 10 0		36.4				
9 41 10 1		10 16 9 9		9 45 8 9	10 16 8 6		10 4 9 8		10 38 9 4		37.4				
10 56 9 8		11 41 9 9		10 55 8 4	11 38 8 4		11 15 9 2		11 55 9 1		38.4				
—		0 21 10 0		—	0 19 8 6		—		0 32 9 3		39.4				
0 58 10 4		1 29 10 9		0 57 8 8	1 33 9 0		1 9 9 5		1 42 9 8		40.4				
1 57 11 3		2 21 11 10		2 6 9 3	2 35 9 8		2 15 10 0		2 45 10 5		41.4				
Mean Spring } Range.				5 ft 10 in.				6 ft. 2 in.							

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
12 38		9	10 48		17	8 36		25	6 11	
12 26		10	10 32		18	8 18		26	5 53	
12 13		11	10 16		19	8 0		27	5 35	
12 0		12	10 0		20	7 43		28	5 16	
11 46		13	9 44		21	7 25		29	4 58	
11 32		14	9 27		22	7 6		30	4 39	
11 18		15	9 10		23	6 48		31	4 21	
11 3		16	8 53		24	6 30				

Times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 5 m.



APRIL, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
		H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.	H. M.	F. I.				
W.	1	10 14	1 52	15	8	2 12	16	6	3 29	13	8	3 52	13	5	9 44	11	2	10 6	11				
Th.	2	11 0	2 27	17	3	2 44	17	11	4 15	14	6	4 37	14	4	10 24	11	11	10 40	12				
F.	3	11 48	3 2	18	6	3 20	19	1	4 57	15	3	5 17	15	1	10 58	12	5	11 16	12				
S.	4	morn.	3 38	19	5	3 57	19	8	5 35	15	8	5 54	15	7	11 34	12	10	11 53	12	1			
S.	5	0 38	4 16	19	9	4 35	19	10	6 13	15	10	6 33	15	9	—	—	0 12	13					
M.	6	1 32	4 53	19	9	5 14	19	7	6 52	15	10	7 9	15	9	0 32	13	0	0 52	12	1			
Tu.	7	2 28	5 32	19	4	5 53	19	0	7 28	15	7	7 47	15	6	1 12	12	10	1 33	12				
W.	8	3 27	6 15	18	6	6 37	17	11	8 8	15	1	8 29	15	1	1 54	12	7	2 16	12				
Th.	9	4 27	7 2	17	2	7 31	16	5	8 51	14	5	9 13	14	6	2 38	12	2	3 3	11	1			
F.	10	5 26	7 59	15	7	8 32	14	11	9 39	13	7	10 7	13	9	3 30	11	6	3 57	11				
S.	11	6 23	9 8	14	6	9 49	14	4	10 39	12	9	11 14	13	1	4 29	10	10	5 4	10				
S.	12	7 18	10 33	14	5	11 17	14	8	11 57	12	4	—	—	5 42	10	4	6 24	10					
M.	13	8 10	11 57	15	1	—	—	—	0 42	13	2	1 27	12	8	7 6	10	5	7 44	10				
Tu.	14	9 0	0 31	15	8	1 21	16	3	2 7	13	9	2 41	13	4	8 20	11	1	8 53	11				
W.	15	9 48	1 31	16	11	1 56	17	7	3 13	14	6	3 40	14	3	9 23	11	9	9 50	12				
Th.	16	10 36	2 19	18	2	2 39	18	7	4 7	15	2	4 31	15	0	10 14	12	4	10 34	12				
F.	17	11 24	2 59	19	0	3 19	19	3	4 53	15	7	5 15	15	5	10 55	12	8	11 15	12				
S.	18	oa 12	3 38	19	4	3 55	19	3	5 34	15	8	5 53	15	7	11 34	12	9	11 52	12				
S.	19	1 2	4 14	19	1	4 33	18	10	6 12	15	7	6 30	15	6	—	—	0 11	12					
M.	20	1 52	4 51	18	7	5 8	18	3	6 48	15	3	7 3	15	1	0 30	12	6	0 50	12				
Tu.	21	2 42	5 26	17	10	5 43	17	5	7 18	14	9	7 34	14	8	1 8	12	2	1 26	12				
W.	22	3 32	6 1	17	0	6 19	16	5	7 50	14	0	8 6	14	1	1 44	11	10	2 2	11				
Th.	23	4 20	6 37	15	10	6 58	15	3	8 21	13	3	8 37	13	5	2 20	11	5	2 38	11				
F.	24	5 8	7 20	14	7	7 42	14	0	8 55	12	5	9 15	12	9	2 59	10	10	3 19	10				
S.	25	5 53	8 7	13	6	8 35	13	1	9 36	11	8	10 2	12	1	3 40	10	4	4 4	10				
S.	26	6 38	9 6	12	11	9 42	12	11	10 31	11	2	11 0	11	10	4 31	9	10	5 1	9				
M.	27	7 22	10 22	13	0	11 0	13	3	11 39	11	1	—	—	5 35	9	7	6 13	9					
Tu.	28	8 6	11 34	13	8	—	—	—	0 21	12	0	1 0	11	8	6 49	9	9	7 22	10				
W.	29	8 51	0 8	14	2	0 37	14	9	1 36	12	8	2 11	12	6	7 55	10	4	8 26	10				
Th.	30	9 37	1 3	15	5	1 28	16	1	2 41	13	6	3 9	13	6	8 54	11	0	9 20	11				
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.								
Phases of the Moon.												Moon's Declination at Noon.											
D. H. M.												M.D. ° ' M.D. ° ' M.D. ° ' M.D. ° '											
Full - - - - 4 4 9 Morning.												1 3 N.39 9 21 S.38 17 11 N. 9 25 16 N.41											
Last Quarter - 11 1 23 Morning.												2 1 S.12 10 19 55 18 15 6 26 13 21											
New - - - - 18 3 5 Morning.												3 6 6 11 16 58 19 18 15 27 9 31											
First Quarter 26 4 8 Morning.												4 10 49 12 13 4 20 20 29 28 5 11											
												5 15 3 13 8 28 21 21 43 29 0 31											
In Perigee - - 9 5 0 Morning.												6 18 31 14 3 29 22 21 54 30 4 S.11											
In Apogee - - 24 9 0 Morning.												7 20 54 15 1 N.37 23 21 5											
												8 21 58 16 6 35 24 19 20											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4m.

APRIL, 1863.

NORTH SHIELDS.				LEITH.				THURSO.				C's AGE AT NOON.	
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.			
Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.		
L. M. F. I.	H. M. F. I.	L. M. F. I.	H. M. F. I.	L. M. F. I.	H. M. F. I.	L. M. F. I.	H. M. F. I.	L. M. F. I.	H. M. F. I.	L. M. F. I.	H. M. F. I.	D.	
35	10 9	1 54	11 2	0 29	13 5	0 48	13 11	6 49	10 9	7 5	11 5	12.9	
13	11 8	2 28	12 1	1 6	14 6	1 23	15 1	7 18	11 11	7 33	12 5	13.9	
44	12 6	3 1	12 10	1 40	15 6	1 58	15 11	7 48	12 10	8 4	13 3	14.9	
17	13 2	3 34	13 5	2 15	16 3	2 33	16 7	8 21	13 7	8 39	13 8	○	
52	13 7	4 11	13 8	2 51	16 9	3 8	16 10	8 56	13 9	9 14	13 9	16.9	
30	13 8	4 49	13 7	3 25	16 9	3 44	16 8	9 34	13 8	9 54	13 6	17.9	
9	13 5	5 30	13 2	4 4	16 6	4 25	16 3	10 15	13 3	10 38	12 11	18.9	
53	12 11	6 16	12 8	4 47	16 0	5 10	15 8	11 1	12 6	11 26	12 1	19.9	
39	12 4	7 5	11 11	5 34	15 3	6 1	14 9	11 53	11 7	—	—	20.9	
35	11 5	8 8	10 11	6 32	14 3	7 3	13 9	0 23	11 1	0 54	10 8	21.9	
46	10 6	9 28	10 3	7 41	13 4	8 22	13 1	1 31	10 3	2 13	10 0	○	
13	10 3	10 55	10 4	9 5	12 11	9 50	13 0	2 58	9 10	3 46	9 11	23.9	
35	10 7	—	—	10 28	13 3	11 3	13 7	4 28	10 0	5 5	10 3	24.9	
10	10 11	0 40	11 3	11 34	13 11	—	—	5 36	10 7	6 4	11 1	25.9	
8	11 7	1 34	12 0	0 2	14 4	0 28	14 9	6 29	11 7	6 50	12 1	26.9	
57	12 4	2 19	12 8	0 51	15 3	1 14	15 8	7 10	12 6	7 27	12 11	27.9	
38	12 11	2 57	13 2	1 34	16 0	1 54	16 3	7 44	13 3	8 2	13 5	28.9	
16	13 3	3 34	13 4	2 14	16 5	2 52	16 6	8 21	13 6	8 37	13 5	●	
52	13 4	4 10	13 3	2 49	16 5	3 6	16 4	8 54	13 3	9 12	13 1	1.4	
28	13 1	4 47	12 10	3 23	16 1	3 42	15 10	9 32	12 10	9 50	12 6	2.4	
5	12 6	5 24	12 3	4 0	15 6	4 18	15 3	10 8	12 2	10 27	11 10	3.4	
42	12 0	6 1	11 8	4 37	14 11	4 56	14 7	10 46	11 6	11 7	11 1	4.4	
20	11 5	6 39	11 1	5 15	14 3	5 35	13 10	11 27	10 8	11 50	10 3	5.4	
1	10 9	7 25	10 4	5 58	13 5	6 21	13 0	—	—	0 13	9 10	6.4	
50	9 11	8 19	9 7	6 45	12 8	7 14	12 4	0 37	9 6	1 4	9 3	7.4	
52	9 5	9 27	9 4	7 46	12 1	8 20	12 0	1 37	9 1	2 11	8 11	8.4	
6	9 4	10 44	9 6	8 59	11 11	9 39	12 1	2 51	8 11	3 35	8 11	9.4	
19	9 9	11 50	10 0	10 13	12 3	10 43	12 7	4 12	9 1	4 44	9 4	10.4	
—	—	0 19	10 4	11 12	12 11	11 39	13 4	5 14	9 7	5 41	10 0	11.4	
46	10 9	1 9	11 1	—	—	0 3	13 9	6 5	10 6	6 26	11 0	12.4	
an Spring } range.				6ft. 8in.				8ft. 2in.				6ft. 7in.	

## Equation of Time at Noon.

L.	S.	Sub.	M.D.	M.	S.	Sub.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.
4	2		9	1	41		17	0	24		25	2	4	
3	44		10	1	24		18	0	38		26	2	14	
3	26		11	1	8		19	0	51		27	2	24	
3	8		12	0	52		20	1	4		28	2	34	
2	50		13	0	36		21	1	17		29	2	43	
2	33		14	0	21		22	1	29		30	2	52	
2	15		15	0	5		23	1	41					
1	58		16	0	9	Add.	24	1	53					

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.



APRIL, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.					
		H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	
W.	1	10 14	10	14	10	4	10	36	10	7	4	34	17	10	4	55	18	5	1	24	11	11	1	46	12	5	
Th.	2	11 0	10	56	10	11	11	11	11	2	5	13	19	1	5	28	19	8	2	7	12	10	2	24	13	3	
F.	3	11 48	11	30	11	5	11	48	11	6	5	45	20	1	6	42	20	5	2	42	13	7	3	0	13	11	
S.	4	morn.	—	—	—	—	0	6	11	8	6	23	20	10	6	42	21	1	3	17	14	3	3	34	14	6	
S.	5	0 38	0	24	11	9	0	42	11	10	7	1	21	4	7	19	21	6	3	53	14	9	4	11	14	10	
M.	6	1 32	1	0	11	10	1	19	11	10	7	39	21	6	7	58	21	6	4	29	14	11	4	47	14	10	
Tu.	7	2 28	1	39	11	9	1	58	11	8	8	16	21	4	8	37	21	1	5	6	14	8	5	27	14	5	
W.	8	3 27	2	19	11	6	2	41	11	4	8	58	20	9	9	20	20	2	5	49	14	1	6	12	13	9	
Th.	9	4 27	3	3	11	2	3	25	10	11	9	43	19	8	10	8	19	1	6	36	13	4	7	3	12	11	
F.	10	5 26	3	49	10	8	4	17	10	6	10	37	18	6	11	10	17	10	7	33	12	6	8	3	12	1	
S.	11	6 23	4	44	10	3	5	18	10	11	50	17	4	—	—	—	—	8	39	11	9	9	18	11	6		
S.	12	7 18	5	54	9	11	6	36	9	11	0	32	16	11	1	12	16	9	10	0	11	4	10	43	11	4	
M.	13	8 10	7	23	10	0	8	5	10	2	1	51	16	10	2	29	17	4	11	22	11	7	11	56	11	11	
Tu.	14	9 0	8	42	10	4	9	15	10	7	3	4	17	9	3	36	18	5	—	—	—	0	27	12	4		
W.	15	9 48	9	45	10	10	10	14	11	1	4	6	19	0	4	34	19	7	0	56	12	9	1	24	13	2	
Th.	16	10 36	10	40	11	3	11	3	11	6	4	58	20	0	5	20	20	5	1	51	13	6	2	15	13	12	
F.	17	11 24	11	24	11	8	11	45	11	9	5	40	20	8	6	120	11	2	36	14	0	2	57	14			
S.	18	oa 12	—	—	—	—	0	5	11	9	6	22	21	0	6	42	21	0	3	16	14	4	3	34	14		
S.	19	1 2	0	23	11	9	0	40	11	8	7	0	21	0	7	18	20	10	3	51	14	5	4	9	14		
M.	20	1 52	0	59	11	7	1	18	11	5	7	37	20	8	7	55	20	5	4	27	14	4	4	45	14		
Tu.	21	2 42	1	37	11	4	1	54	11	2	8	12	20	2	8	30	19	10	5	2	13	10	5	20	13		
W.	22	3 32	2	12	10	11	2	30	10	9	8	48	19	5	9	6	18	11	5	38	13	2	5	57	12	11	
Th.	23	4 20	2	48	10	7	3	7	10	5	9	25	18	5	9	44	17	11	6	17	12	6	6	37	12		
F.	24	5 8	3	25	10	2	3	45	10	0	10	4	17	5	10	26	16	11	6	59	11	9	7	22	11		
S.	25	5 53	4	5	9	9	4	27	9	7	10	52	16	5	11	22	16	1	7	46	11	1	8	12	10	11	
S.	26	6 38	4	53	9	6	5	21	9	5	11	56	15	9	—	—	—	8	43	10	7	9	16	10			
M.	27	7 22	5	52	9	4	6	29	9	4	0	30	15	7	1	5	15	6	9	54	10	5	10	32	10		
Tu.	28	8 6	7	12	9	5	7	49	9	7	1	40	15	8	2	14	16	0	11	7	10	8	11	37	11		
W.	29	8 51	8	21	9	9	8	52	10	0	2	44	16	5	3	13	17	1	—	—	—	0	5	11			
Th.	30	9 37	9	20	10	3	9	46	10	6	3	42	17	8	4	7	18	3	0	32	11	10	0	57	12		

Half Mean Spring } Range.	5ft. 9in.	10ft. 5in.	7ft. 2in.
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Phases of the Moon.				Moon's Declination at Noon.											
	D.	H.	M.	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
Full	- - -	4	4	9	Morning.	1	3 N. 39	9	21 S. 38	17	11 N. 9	25	16 N. 4		
Last Quarter	11	1	23	Morning.	2	1 S. 12	10	19 55	18	15 6	26	13 4			
New	- - -	18	3	5	Morning.	3	6 6	11	16 58	19	18 15	27	9 3		
First Quarter	26	4	8	Morning.	4	10 49	12	13 4	20	20 29	28	5 1			
					5	15 3	13	8 28	21	21 43	29	0 4			
In Perigee	-	9	5	0	Morning.	6	18 31	14	3 29	22	21 54	30	4 S. 1		
In Apogee	-	24	9	0	Morning.	7	20 54	15	1 N. 37	23	21 5				
					8	21 58	16	6 35	24	19 20					

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
HARWICH subtract 5 m.      HULL add 1 m.      SUNDERLAND add 5 m.

APRIL, 1863.

NORTH SHIELDS.				LEITH.				THURSO.				C's AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
ne.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.	
35	10 9	1 54	11 2	0 29	13 5	0 48	13 11	6 49	10 9	7 5	11 5	12.9
13	11 8	2 28	12 1	1 6	14 6	1 23	15 1	7 18	11 11	7 33	12 5	13.9
44	12 6	3 1	12 10	1 40	15 6	1 58	15 11	7 48	12 10	8 4	13 3	14.9
17	13 2	3 34	13 5	2 15	16 3	2 33	16 7	8 21	13 7	8 39	13 8	○
52	13 7	4 11	13 8	2 51	16 9	3 8	16 10	8 56	13 9	9 14	13 9	16.9
30	13 8	4 49	13 7	3 25	16 9	3 44	16 8	9 34	13 8	9 54	13 6	17.9
9	13 5	5 30	13 2	4 4	16 6	4 25	16 3	10 15	13 3	10 38	12 11	18.9
53	12 11	6 16	12 8	4 47	16 0	5 10	15 8	11 1	12 6	11 26	12 1	19.9
39	12 4	7 5	11 11	5 34	15 3	6 1	14 9	11 53	11 7	—	—	20.9
35	11 5	8 8	10 11	6 32	14 3	7 3	13 9	0 23	11 1	0 54	10 8	21.9
46	10 6	9 28	10 3	7 41	13 4	8 22	13 1	1 31	10 3	2 13	10 0	○
13	10 3	10 55	10 4	9 5	12 11	9 50	13 0	2 58	9 10	3 46	9 11	23.9
35	10 7	—	—	10 28	13 3	11 3	13 7	4 28	10 0	5 5	10 3	24.9
10	10 11	0 40	11 3	11 34	13 11	—	—	5 36	10 7	6 4	11 1	25.9
8	11 7	1 34	12 0	0 2	14 4	0 28	14 9	6 29	11 7	6 50	12 1	26.9
57	12 4	2 19	12 8	0 51	15 3	1 14	15 8	7 10	12 6	7 27	12 11	27.9
38	12 11	2 57	13 2	1 34	16 0	1 54	16 3	7 44	13 3	8 2	13 5	28.9
16	13 3	3 34	13 4	2 14	16 5	2 52	16 6	8 21	13 6	8 37	13 5	●
52	13 4	4 10	13 3	2 49	16 5	3 6	16 4	8 54	13 3	9 12	13 1	1.4
28	13 1	4 47	12 10	3 23	16 1	3 42	15 10	9 32	12 10	9 50	12 6	2.4
5	12 6	5 24	12 3	4 0	15 6	4 18	15 3	10 8	12 2	10 27	11 10	3.4
42	12 0	6 1	11 8	4 37	14 11	4 56	14 7	10 46	11 6	11 7	11 1	4.4
20	11 5	6 39	11 1	5 15	14 3	5 35	13 10	11 27	10 8	11 50	10 3	5.4
1	10 9	7 25	10 4	5 58	13 5	6 21	13 0	—	—	0 13	9 10	6.4
50	9 11	8 19	9 7	6 45	12 8	7 14	12 4	0 37	9 6	1 4	9 3	7.4
52	9 5	9 27	9 4	7 46	12 1	8 20	12 0	1 37	9 1	2 11	8 11	8.4
6	9 4	10 44	9 6	8 59	11 11	9 39	12 1	2 51	8 11	3 35	8 11	9.4
19	9 9	11 50	10 0	10 13	12 3	10 43	12 7	4 12	9 1	4 44	9 4	10.4
—	—	0 19	10 4	11 12	12 11	11 39	13 4	5 14	9 7	5 41	10 0	11.4
46	10 9	1 9	11 1	—	—	0 3	13 9	6 5	10 6	6 26	11 0	12.4
n Spring } nge.				8ft. 2in.				6ft. 7in.				

## Equation of Time at Noon.

S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
2		9	1 41		17	0 24		25	2 4	
44		10	1 24		18	0 38		26	2 14	
26		11	1 8		19	0 51		27	2 24	
8		12	0 52		20	1 4		28	2 34	
50		13	0 36		21	1 17		29	2 43	
33		14	0 21		22	1 29		30	2 52	
15		15	0 5		23	1 41				
58		16	0 9	Add.	24	1 53				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.

TIDE TABLES FOR THE

APRIL, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.									
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.						
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.					
			H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.					
W.	1	10 14	10 6	8 9	10 26	9 0	9 28 22	6	9 47 23	5	4 3 17	7	4 26 18	13										
Th.	2	11 0	10 43	9 2	11 2	9 4	10 24 2	10 18 24	9	4 45 19	1	5 5 19	9											
F.	3	11 48	11 22	9 5	11 41	9 7	10 35 25	3	10 54 25	9	5 26 20	3	5 46 20	9										
S.	4	morn.	—	—	0 1	9 9	11 13 26	2	11 33 26	7	6 5 21	2	6 24 21	6										
S.	5	0 38	0 21	9 10	0 39	9 11	11 51 26	9	—	—	6 42 21	9	7 1 21	9										
M.	6	1 32	0 59	9 11	1 19	10 0	0 10 26	10	0 29 26	10	7 20 21	9	7 39 21	6										
Tu.	7	2 28	1 39	9 11	1 58	9 11	0 49 26	8	1 9 26	4	7 59 21	3	8 21 20	10										
W.	8	3 27	2 19	9 10	2 41	9 9	1 30 25	9	1 51 25	2	8 43 20	5	9 5 19	10										
Th.	9	4 27	3 3	9 6	3 26	9 4	2 13 24	6	2 37 23	9	9 28 19	1	9 54 18	9										
F.	10	5 26	3 53	9 2	4 21	9 0	3 5 23	0	3 32 22	2	10 20 17	9	10 48 17	4										
S.	11	6 23	4 53	8 9	5 29	8 7	4 7 21	6	4 46 20	11	11 17 16	5	11 52 16	2										
S.	12	7 18	6 8	8 6	6 50	8 5	5 29 20	8	6 17 20	10	—	—	0 31 16	2										
M.	13	8 10	7 31	8 5	8 9	8 7	7 1 21	3	7 38 21	9	1 15 16	4	1 58 16	9										
Tu.	14	9 0	8 43	8 10	9 15	9 0	8 12 22	6	8 40 23	3	2 35 17	5	3 10 18	9										
W.	15	9 48	9 44	9 2	10 11	9 4	9 7 23	11	9 31 24	7	3 41 18	10	4 10 19	6										
Th.	16	10 36	10 34	9 5	10 56	9 6	9 53 25	2	10 13 25	6	4 36 20	0	5 0 20	5										
F.	17	11 24	11 18	9 7	11 40	9 8	10 33 25	10	10 53 26	0	5 23 20	9	5 45 20	11										
S.	18	0 12	—	—	0 1	9 9	11 13 26	1	11 32 26	1	6 5 21	1	6 23 21	1										
S.	19	1 2	0 20	9 9	0 38	9 9	11 50 26	0	—	—	6 41 21	0	6 59 20	9										
M.	20	1 52	0 57	9 8	1 16	9 7	0 8 25	9	0 27 25	6	7 17 20	6	7 35 20	2										
Tu.	21	2 42	1 34	9 6	1 52	9 5	0 45 25	1	1 3 24	7	7 52 19	9	8 10 19	10										
W.	22	3 32	2 9	9 4	2 27	9 2	1 20 24	1	1 37 23	6	8 28 18	10	8 47 18	10										
Th.	23	4 20	2 45	9 0	3 3	8 10	1 55 22	10	2 13 22	3	9 5 17	9	9 23 17	7										
F.	24	5 8	3 22	8 9	3 42	8 7	2 32 21	7	2 53 21	0	9 42 16	8	10 2 16	10										
S.	25	5 53	4 4	8 6	4 28	8 4	3 15 20	4	3 40 19	10	10 23 15	8	10 47 15	9										
S.	26	6 38	4 56	8 2	5 26	8 1	4 11 19	5	4 44 19	1	11 13 14	10	11 45 14	10										
M.	27	7 22	6 1	8 0	6 39	8 0	5 23 19	1	6 5 19	3	—	—	0 20 14	10										
Tu.	28	8 6	7 15	8 1	7 48	8 2	6 44 19	8	7 17 20	2	0 56 15	0	1 33 15	10										
W.	29	8 51	8 20	8 4	8 49	8 6	7 48 20	10	8 17 21	6	2 9 15	11	2 41 16	10										
Th.	30	9 37	9 16	8 9	9 41	8 11	8 41 22	3	9 4 23	1	3 11 17	3	3 37 18	10										
Half Mean Spring Range.			4 ft. 10 in.						13 ft. 0 in.						10 ft. 6 in.									
Phases of the Moon.			Moon's Declination at Noon.																					
D. H. M.			M.D.		°		'		M.D.		°		'		M.D.		°		'		M.D.		°	
Full	—	—	4	9	Morning.	1	3	N. 39	9	21	S. 38	17	11	N. 9	25	16	N. 4	25	16	N. 4	25	16	N. 4	
Last Quarter	—	—	11	1	23	Morning.	2	1	S. 12	10	19	55	18	15	6	26	13	2	13	2	13	2	13	
New	—	—	18	3	5	Morning.	3	6	6	11	16	58	19	18	15	27	9	3	27	9	3	27	9	
First Quarter	—	—	26	4	8	Morning.	4	10	49	12	13	4	20	20	29	28	5	1	28	5	1	28	5	
In Perigee	—	—	9	5	0	Morning.	5	15	3	13	8	28	21	21	43	29	0	3	29	0	3	29	0	
In Apogee	—	—	24	9	0	Morning.	6	18	31	14	3	29	22	21	54	30	4	8	30	4	8	30	4	
							7	20	54	15	1N. 37	23	21	5										
							8	21	58	16	6	35	24	19	20									

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
GREENOCK add 19 m. | LIVERPOOL add 13 m. | PEMBROKE add 20 m.

## APRIL, 1863.

WESTON-SUPER-MARE.										HOLYHEAD.										KINGSTOWN.										C's Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	D.								
4 41 31	7	5 53 32	11	8 24 13	11	8 42 14	5	9 18 9	9	9 40 10	0	12.9																		
5 26 34	1	5 46 35	2	8 57 14	11	9 13 15	3	9 56 10	3	10 13 10	6	13.9																		
6 7 36	0	6 28 36	10	9 31 15	7	9 48 15	11	10 29 10	8	10 46 10	11	14.9																		
6 47 37	6	7 7 37	11	10 6 16	2	10 23 16	4	11 3 11	1	11 21 11	2	0																		
7 26 38	4	7 45 38	6	10 40 16	6	10 57 16	6	11 39 11	3	11 58 11	2	16.9																		
8 3 38	5	8 22 38	3	11 15 16	5	11 35 16	4	—	—	0 18 11	2	17.9																		
8 41 37	11	9 1 37	4	11 56 16	1	—	—	0 38 11	1	0 59 10	11	18.9																		
9 21 36	8	9 41 35	9	0 19 15	10	0 43 15	6	1 22 10	9	1 45 10	6	19.9																		
10 2 34	8	10 24 33	6	1 8 15	1	1 35 14	7	2 8 10	3	2 35 10	0	20.9																		
10 46 32	3	11 15 31	2	2 5 14	2	2 35 13	9	3 4 9	9	3 34 9	7	21.9																		
11 49 30	2	—	—	3 12 13	4	3 54 13	1	4 11 9	4	4 52 9	1	0																		
0 28 29	8	1 9 29	7	4 38 13	0	5 23 13	1	5 32 9	0	6 12 9	1	23.9																		
1 52 30	0	2 31 30	8	6 2 13	4	6 37 13	7	6 49 9	3	7 24 9	6	24.9																		
3 8 31	7	3 45 32	7	7 8 14	0	7 36 14	5	7 56 9	9	8 27 9	11	25.9																		
4 19 33	7	4 50 34	8	8 3 14	10	8 27 15	2	8 56 10	2	9 24 10	5	26.9																		
5 17 35	7	5 41 36	3	8 48 15	6	9 8 15	9	9 48 10	7	10 7 10	9	27.9																		
6 4 36	10	6 26 37	1	9 28 15	11	9 47 16	1	10 25 10	11	10 44 11	0	28.9																		
6 47 37	3	7 6 37	3	10 5 16	2	10 22 16	1	11 2 11	0	11 19 11	0	0																		
7 25 37	3	7 43 36	11	10 38 16	0	10 55 15	10	11 37 10	11	11 56 10	10	1.4																		
8 1 36	6	8 18 36	0	11 13 15	7	11 30 15	4	—	—	0 16 10	8	2.4																		
8 35 35	5	8 51 34	10	11 49 15	1	—	—	6 34 10	6	0 52 10	4	3.4																		
9 8 34	2	9 24 33	5	0 8 14	9	0 28 14	5	1 11 10	2	1 30 9	11	4.4																		
9 40 32	5	9 56 31	6	0 49 14	1	1 9 13	8	1 49 9	9	2 9 9	6	5.4																		
10 12 30	7	10 30 29	7	1 31 13	4	1 54 12	11	2 31 9	4	2 53 9	1	6.4																		
10 50 28	9	11 16 28	1	2 18 12	7	2 45 12	4	3 17 8	11	3 44 8	9	7.4																		
11 46 27	7	—	—	3 18 12	1	3 52 12	0	4 16 8	7	4 50 8	6	8.4																		
0 21 27	4	0 58 27	5	4 32 12	0	5 12 12	1	5 25 8	6	6 1 8	7	9.4																		
1 35 27	10	2 9 28	5	5 47 12	4	6 17 12	8	6 34 8	9	7 4 8	11	10.4																		
2 42 29	3	3 15 30	1	6 46 13	0	7 13 13	5	7 33 9	2	8 2 9	5	11.4																		
3 46 31	2	4 15 32	3	7 37 13	10	8 0 14	3	8 28 9	8	8 53 9	11	12.4																		
Mean Spring } Range.					18ft. 7in.					8ft. 0in.					5ft. 6in.															

## Equation of Time at Noon.

M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
4 2	Sub.	9	1 41	Sub.	17	0 24	Add.	25	2 4	Add.
3 44		10	1 24		18	0 38		26	2 14	
3 26		11	1 8		19	0 51		27	2 24	
3 8		12	0 52		20	1 4		28	2 34	
2 50		13	0 36		21	1 17		29	2 43	
2 33		14	0 21		22	1 29		30	2 52	
2 15		15	0 5		23	1 41				
1 58		16	0 9	Add.	24	1 53				

as of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 13 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

APRIL, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERY.						SLIGO BAY.																																
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																													
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																												
			H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.																									
W.	1	10 14	8 58	8 7	9 17	8 10	6 9	6 8	6 27	6 11	3 28	9 5	3 45	5																																	
Th.	2	11 0	9 33	9 0	9 49	9 2	6 43	7 2	7 1	7 4	3 59	10 3	4 15	10																																	
F.	3	11 48	10 6	9 4	10 24	9 6	7 19	7 6	7 38	7 8	4 33	10 10	4 51	11																																	
S.	4	morn.	10 42	9 7	11 0	9 7	7 56	7 10	8 14	7 11	5 10	11 4	5 30	11																																	
♄	5	0 38	11 18	9 8	11 35	9 7	8 31	8 0	8 48	8 0	5 48	11 7	6 5	11																																	
M.	6	1 32	11 53	9 7	—	—	9 5	7 11	9 23	7 9	6 23	11 6	6 43	11																																	
Tu.	7	2 28	0 14	9 7	0 35	9 6	9 42	7 7	10 2	7 5	7 4	11 2	7 26	10																																	
W.	8	3 27	0 58	9 5	1 21	9 3	10 24	7 3	10 46	7 0	7 48	10 6	8 10	10																																	
Th.	9	4 27	1 47	9 2	2 16	9 0	11 14	6 8	11 51	6 4	8 36	9 9	9 6	9																																	
F.	10	5 26	2 46	8 9	3 17	8 7	—	—	0 30	6 0	9 41	9 1	10 21	8																																	
S.	11	6 23	3 54	8 5	4 33	8 4	1 15	5 10	2 4	5 9	11 3	8 8	11 46	8																																	
♄	12	7 18	5 13	8 3	5 53	8 3	2 50	5 10	3 31	6 1	—	—	0 27	8																																	
M.	13	8 10	6 33	8 3	7 10	8 4	4 6	6 4	4 36	6 6	1 7	8 10	1 43	9																																	
Tu.	14	9 0	7 42	8 5	8 10	8 8	5 1	6 9	5 25	6 11	2 15	9 4	2 42	9																																	
W.	15	9 48	8 37	8 11	9 1	9 1	5 48	7 1	6 11	7 4	3 8	10 0	3 30	10																																	
Th.	16	10 36	9 23	9 3	9 44	9 4	6 34	7 6	6 55	7 7	3 50	10 8	4 10	10																																	
F.	17	11 24	10 4	9 5	10 23	9 6	7 16	7 8	7 37	7 9	4 30	11 1	4 50	11																																	
S.	18	0 12	10 41	9 6	10 58	9 6	7 56	7 9	8 13	7 9	5 10	11 4	5 28	11																																	
♄	19	1 2	11 16	9 5	11 33	9 4	8 29	7 9	8 45	7 7	5 46	11 3	6 3	11																																	
M.	20	1 52	11 51	9 3	—	—	9 2	7 5	9 19	7 3	6 21	10 11	6 39	10																																	
Tu.	21	2 42	0 9	9 2	0 28	9 1	9 36	7 1	9 52	6 10	6 57	10 5	7 15	10																																	
W.	22	3 32	0 47	9 0	1 6	8 11	10 9	6 8	10 27	6 5	7 33	9 9	7 51	9																																	
Th.	23	4 20	1 27	8 10	1 49	8 8	10 47	6 2	11 13	5 11	8 10	9 1	8 32	8																																	
F.	24	5 8	2 12	8 6	2 36	8 4	11 40	5 8	—	—	8 56	8 6	9 23	8																																	
S.	25	5 53	3 0	8 2	3 27	8 1	0 12	5 5	0 46	5 3	9 53	8 0	10 27	7																																	
♄	26	6 38	3 58	8 0	4 31	7 11	1 24	5 3	2 3	5 2	11 2	7 10	11 39	7																																	
M.	27	7 22	5 4	7 10	5 42	7 10	2 43	5 3	3 20	5 6	—	—	0 16	8																																	
Tu.	28	8 6	6 17	7 11	6 49	8 0	3 52	5 9	4 19	6 0	0 51	8 2	1 22	8																																	
W.	29	8 51	7 20	8 1	7 47	8 3	4 43	6 2	5 5	6 5	1 52	8 7	2 20	8																																	
Th.	30	9 37	8 11	8 5	8 34	8 8	5 25	6 7	5 45	6 10	2 43	9 3	3 5	9																																	
Half Mean Spring } Range.			4 ft. 9 in.						3 ft. 10 in.						5 ft. 7 in.																																
Phases of the Moon.																								Moon's Declination at Noon.																							
D. H. M.																								M.D. ° ' M.D. ° ' M.D. ° ' M.D. ° '																							
Full - - - 4 4 9 Morning.																								1 3 N.39 9 21 S.38 17 11 N. 9 25 16 N																							
Last Quarter - 11 1 23 Morning.																								2 1 S.12 10 19 55 18 15 6 26 13																							
New - - - 18 3 5 Morning.																								3 6 6 11 16 58 19 18 15 27 9																							
First Quarter - 26 4 8 Morning.																								4 10 49 12 13 4 20 20 29 28 5																							
																								5 15 3 13 8 28 21 21 43 29 0																							
																								6 18 31 14 3 29 22 21 54 30 4 S																							
In Perigee - 9 5 0 Morning.																								7 20 54 15 1 N.37 23 21 5																							
In Apogee - 24 9 0 Morning.																								8 21 58 16 6 35 24 19 20																							

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required, BELFAST subtract 3 m. LONDONDERY add 4 m. SLIGO BAY add 9 m.

APRIL, 1863.

GALWAY.				QUEENSTOWN.				WATERFORD.				C's AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.
2 42	12 4	3 1	12 10	2 58	10 0	3 20	10 5	3 11	10 10	3 34	11 2	12.9
3 19	13 4	3 35	13 9	3 37	10 9	3 56	11 1	3 55	11 6	4 15	11 10	13.9
3 53	14 2	4 11	14 7	4 15	11 4	4 34	11 7	4 37	12 1	4 57	12 4	14.9
4 29	14 11	4 47	15 2	4 53	11 10	5 13	12 0	5 16	12 6	5 35	12 7	○
5 5	15 4	5 26	15 4	5 32	12 1	5 52	12 1	5 51	12 9	6 12	12 10	16.9
5 44	15 4	6 4	15 2	6 11	12 1	6 31	12 0	6 31	12 10	6 52	12 9	17.9
6 25	15 0	6 47	14 8	6 51	11 11	7 12	11 8	7 12	12 8	7 33	12 6	18.9
7 10	14 3	7 33	13 10	7 34	11 5	7 56	11 2	7 54	12 4	8 15	12 1	19.9
8 0	13 4	8 29	12 9	8 19	10 10	8 44	10 5	8 37	11 9	9 1	11 5	20.9
8 59	12 1	9 33	11 8	9 11	10 1	9 40	9 9	9 25	11 1	9 56	10 9	21.9
9 12	11 4	10 54	11 3	10 13	9 6	10 53	9 5	10 35	10 5	11 14	10 3	○
1 38	11 4	—	—	11 35	9 5	—	—	11 53	10 2	—	—	23.9
1 19	11 7	0 55	11 11	0 17	9 6	0 55	9 9	0 30	10 3	1 6	10 6	24.9
1 26	12 4	1 54	12 10	1 32	10 0	2 6	10 4	1 41	10 9	2 16	11 1	25.9
2 1	13 3	2 46	13 8	2 36	10 8	3 4	10 11	2 49	11 5	3 19	11 9	26.9
3 10	14 0	3 30	14 4	3 28	11 3	3 51	11 5	3 46	12 0	4 10	12 2	27.9
3 50	14 7	4 10	14 9	4 13	11 7	4 33	11 9	4 34	12 4	4 56	12 5	28.9
4 29	14 10	4 46	14 10	4 53	11 10	5 12	11 10	5 16	12 5	5 34	12 5	●
5 4	14 10	5 23	14 8	5 31	11 9	5 50	11 8	5 51	12 5	6 10	12 4	1.4
5 43	14 5	6 0	14 2	6 9	11 6	6 26	11 4	6 29	12 2	6 47	12 1	2.4
6 18	13 10	6 36	13 6	6 44	11 2	7 2	10 11	7 5	11 11	7 23	11 9	3.4
6 55	13 2	7 14	12 9	7 20	10 8	7 38	10 5	7 40	11 6	7 57	11 4	4.4
7 34	12 4	7 56	11 10	7 55	10 1	8 13	9 10	8 14	11 1	8 32	10 9	5.4
8 18	11 5	8 42	10 11	8 32	9 7	8 53	9 3	8 50	10 7	9 8	10 3	6.4
9 7	10 6	9 37	10 3	9 15	9 0	9 41	8 10	9 31	10 1	10 0	9 10	7.4
10 10	10 2	10 47	10 2	10 10	8 9	10 46	8 8	10 33	9 7	11 7	9 6	8.4
1 27	10 4	—	—	11 24	8 9	—	—	11 42	9 6	—	—	9.4
1 3	10 6	0 34	10 10	0 1	8 10	0 34	9 1	0 15	9 7	0 45	9 10	10.4
1 4	11 3	1 31	11 8	1 6	9 4	1 38	9 7	1 16	10 0	1 46	10 4	11.4
1 54	12 2	2 17	12 8	2 7	9 11	2 33	10 3	2 16	10 9	2 44	11 0	12.4
San Spring } 7ft. 5in. nge.				5ft. 10in.				6ft. 2in.				

## Equation of Time at Noon.

M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
4 2	Sub.	9	1 41	Sub.	17	0 24	Add.	25	2 4	Add.
3 44		10	1 24		18	0 38		26	2 14	
3 26		11	1 8		19	0 51		27	2 24	
3 8		12	0 52		20	1 4		28	2 34	
2 50		13	0 36		21	1 17		29	2 43	
2 33		14	0 21		22	1 29		30	2 52	
2 15		15	0 5		23	1 41				
1 58		16	0 9	Add.	24	1 53				

s of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 ALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.



# TIDE TABLES FOR THE

MAY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.				DEVONPORT.				PORTSMOUTH.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.
F.	1	10 27	1 49	16 10	2 9	17 6	3 34	14 5	3 58	14 5	9 43	11 9	10 4	12 1
S.	2	11 19	2 29	18 2	2 49	18 9	4 21	14 11	4 43	15 1	10 24	12 3	10 45	12 1
☾.	3	morn.	3 9	19 2	3 30	19 6	5 5	15 5	5 26	15 7	11 5	12 8	11 25	12 1
M.	4	0 16	3 51	19 8	4 14	19 9	5 48	15 9	6 9	15 10	11 46	12 11	—	—
Tu.	5	1 15	4 35	19 9	4 56	19 7	6 31	15 10	6 53	16 0	0 10	13 0	0 33	12 1
W.	6	2 17	5 19	19 4	5 42	19 1	7 13	15 7	7 34	15 10	0 56	12 10	1 19	12 1
Th.	7	3 18	6 7	18 8	6 33	18 1	7 56	15 2	8 21	15 5	1 44	12 8	2 8	12 1
F.	8	4 18	6 59	17 6	7 28	16 10	8 45	14 7	9 10	14 10	2 34	12 3	2 59	12 1
S.	9	5 14	7 58	16 2	8 29	15 7	9 37	13 9	10 6	14 1	3 28	11 8	3 56	11 1
☾.	10	6 7	9 2	15 2	9 36	15 0	10 37	13 0	11 10	13 6	4 26	11 2	4 58	10 1
M.	11	6 57	10 12	14 11	10 49	15 0	11 45	12 7	—	—	5 30	10 9	6 3	10 1
Tu.	12	7 45	11 25	15 2	12 0	15 6	0 25	13 3	1 2	12 9	6 38	10 7	7 12	10 1
W.	13	8 33	—	—	0 30	15 10	1 38	13 7	2 13	13 5	7 47	11 0	8 20	11 1
Th.	14	9 20	0 59	16 3	1 27	16 7	2 45	14 2	3 13	14 1	8 50	11 5	9 19	11 1
F.	15	10 7	1 51	17 0	2 14	17 4	3 38	14 6	4 4	14 6	9 45	11 9	10 9	11 1
S.	16	10 56	2 35	17 7	2 55	17 11	4 27	14 8	4 48	14 10	10 31	12 0	10 51	12 1
☾.	17	11 45	3 15	18 1	3 35	18 0	5 10	14 11	5 29	15 0	11 11	12 1	11 31	12 1
M.	18	0 35	3 54	17 11	4 14	17 10	5 48	14 11	6 7	15 1	11 50	12 1	—	—
Tu.	19	1 25	4 33	17 8	4 49	17 6	6 25	14 9	6 41	15 0	0 10	12 0	0 30	11 1
W.	20	2 14	5 5	17 3	5 22	17 0	6 56	14 4	7 12	14 8	0 48	11 10	1 5	11 1
Th.	21	3 2	5 40	16 9	5 59	16 6	7 28	13 11	7 43	14 3	1 23	11 7	1 42	11 1
F.	22	3 48	6 17	16 2	6 36	15 9	8 0	13 3	8 16	13 9	1 59	11 5	2 18	11 1
S.	23	4 33	6 55	15 4	7 18	15 0	8 32	12 8	8 49	13 2	2 37	11 1	2 56	10 1
☾.	24	5 16	7 42	14 7	8 5	14 2	9 12	12 1	9 34	12 7	3 18	10 9	3 40	10 1
M.	25	6 0	8 29	13 11	8 56	13 9	9 57	11 8	10 23	12 3	4 2	10 5	4 26	10 1
Tu.	26	6 43	9 26	13 8	10 2	13 10	10 49	11 6	11 20	12 1	4 52	10 2	5 20	10 1
W.	27	7 28	10 35	14 0	11 7	14 3	11 58	11 9	—	—	5 54	10 0	6 25	10 1
Th.	28	8 14	11 38	14 7	—	—	0 37	12 6	1 12	12 6	6 55	10 3	7 25	10 1
F.	29	9 5	0 9	15 1	0 37	15 7	1 47	13 2	2 22	13 3	7 57	10 9	8 27	11 1
S.	30	9 59	1 4	16 2	1 31	16 9	2 50	13 9	3 18	14 0	8 55	11 5	9 23	11 1
☾.	31	10 57	1 56	17 6	2 21	18 1	3 45	14 5	4 12	14 9	9 50	12 0	10 17	12 1
Half Mean Spring Range.			9 <sup>ft.</sup> 6 <sup>in.</sup>				7 <sup>ft.</sup> 9 <sup>in.</sup>				6 <sup>ft.</sup> 4 <sup>in.</sup>			
Phases of the Moon.							Moon's Declination at Noon.							
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°
Full - - - - 3 2 52 Afternoon.							1	9	8. 3	9	13	8. 53	17	19 N. 54
Last Quarter - 10 7 15 Morning.							2	13	30	10	9	25	18	21 24
New - - - - 17 4 48 Afternoon.							3	17	19	11	4	31	19	21 54
First Quarter - 25 8 47 Afternoon.							4	20	8	12	0	N. 30	20	21 22
							5	21	41	13	5	25	21	19 54
							6	21	46	14	10	0	22	17 34
In Perigee - - 6 6 0 Morning.							7	20	21	15	14	4	23	14 30
In Apogee - - 22 2 0 Morning.							8	17	39	16	17	25	24	10 50

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, —  
**BREST** add 18 m.      **DEVONPORT** add 17 m.      **PORTSMOUTH** add 4 m.

MAY, 1863.

MONTH DAY.	DOVER.								SHEERNESS.								LONDON.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	D						
1	9 5 17 0	9 27 17 6	11 2 14 9	11 23 15 1	0 6 16 10	0 28 17 2	13.4																		
2	9 48 17 11	10 11 18 4	11 42 15 5	—	0 50 17 7	1 11 18 0	14.4																		
3	10 33 18 8	10 54 18 11	0 2 15 9	0 22 16 0	1 33 18 5	1 53 18 9	0																		
4	11 19 19 1	11 43 19 2	0 42 16 2	1 2 16 4	2 13 19 0	2 33 19 3	16.4																		
5	—	0 7 19 3	1 22 16 6	1 45 16 6	2 54 19 5	3 16 19 7	17.4																		
6	0 30 19 2	0 56 19 0	2 7 16 5	2 28 16 4	3 37 19 7	3 58 19 6	18.4																		
7	1 22 18 10	1 48 18 6	2 50 16 3	3 12 16 0	4 20 19 5	4 44 19 3	19.4																		
8	2 14 18 2	2 41 17 8	3 37 15 9	4 3 15 5	5 8 19 0	5 33 18 8	20.4																		
9	3 9 17 3	3 37 16 9	4 29 15 0	4 58 14 8	5 59 18 3	6 28 17 11	21.4																		
10	4 7 16 3	4 36 15 10	5 30 14 4	6 3 14 1	6 58 17 6	7 30 17 2	0																		
11	5 5 15 6	5 34 15 5	6 39 13 10	7 16 13 9	8 5 16 11	8 43 16 9	23.4																		
12	6 5 15 5	6 38 15 7	7 54 13 9	8 30 13 10	9 20 16 8	9 54 16 7	24.4																		
13	7 13 15 11	7 45 16 3	9 4 14 1	9 37 14 4	10 30 16 9	11 6 16 10	25.4																		
14	8 14 16 7	8 42 16 10	10 6 14 7	10 34 14 10	11 37 17 1	—	26.4																		
15	9 8 17 1	9 32 17 4	11 1 15 0	11 24 15 2	0 4 17 4	0 30 17 6	27.4																		
16	9 55 17 6	10 18 17 8	11 46 15 4	—	0 53 17 9	1 17 17 11	28.4																		
17	10 39 17 9	11 1 17 9	0 8 15 5	0 28 15 6	1 38 18 1	2 0 18 3	0																		
18	11 23 17 9	11 43 17 8	0 48 15 7	1 8 15 7	2 19 18 4	2 39 18 5	0.8																		
19	—	0 3 17 7	1 26 15 6	1 46 15 5	2 57 18 5	3 15 18 5	1.8																		
20	0 22 17 5	0 40 17 3	2 4 15 4	2 20 15 2	3 32 18 4	3 49 18 3	2.8																		
21	1 0 17 1	1 20 16 11	2 36 15 0	2 52 14 11	4 6 18 1	4 25 17 11	3.8																		
22	1 39 16 9	1 58 16 6	3 10 14 9	3 28 14 6	4 43 17 10	5 0 17 8	4.8																		
23	2 18 16 3	2 38 16 0	3 47 14 4	4 6 14 1	5 19 17 5	5 37 17 2	5.8																		
24	2 59 15 9	3 21 15 5	4 26 13 10	4 48 13 8	5 56 17 0	6 17 16 9	6.8																		
25	3 43 15 2	4 6 14 11	5 12 13 6	5 37 13 3	6 42 16 6	7 5 16 4	0																		
26	4 30 14 8	4 56 14 6	6 4 13 2	6 34 13 0	7 30 16 2	7 59 16 0	8.8																		
27	5 27 14 6	5 55 14 7	7 6 13 0	7 43 13 1	8 32 15 11	9 7 16 0	9.8																		
28	6 21 14 10	6 51 15 2	8 17 13 3	8 47 13 6	9 40 16 1	10 11 16 2	10.8																		
29	7 23 15 7	7 52 16 1	9 16 13 10	9 45 14 10	10 43 16 4	11 14 16 7	11.8																		
30	8 20 16 6	8 47 17 0	10 13 14 5	10 39 14 9	11 41 16 11	—	12.8																		
31	9 13 17 6	9 41 17 11	11 4 15 1	11 28 15 5	0 7 17 3	0 33 17 7	13.8																		
Half Mean Spring Range. } 9ft. 4in.								8ft. 0in.								9ft. 7in.									

## Equation of Time at Noon.

D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
3	0		9	3 44		17	3 52		25	3 23	
3	7		10	3 47		18	3 50		26	3 17	
3	14		11	3 50		19	3 48		27	3 11	
3	21		12	3 52		20	3 45		28	3 4	
3	27		13	3 53		21	3 41		29	2 57	
3	32		14	3 53		22	3 38		30	2 49	
3	37		15	3 53		23	3 33		31	2 41	
3	41		16	3 53		24	3 28				

Lines of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.



MAY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.																																
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																													
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																												
			H. M.	H. M.	F. I.	H. M.	H. M.	F. I.	H. M.	H. M.	F. I.	H. M.	H. M.	F. I.	H. M.	H. M.	F. I.	H. M.	H. M.	F. I.	H. M.	H. M.	F. I.																								
F. S.	1	10 27	10 11	10 9		10 34	11 0		4 31	18 10		4 52	19 5		1 21	12 8		1 44	13 1		1 10	12 27																									
	2	11 19	10 52	11 3		11 13	11 6		5 11	19 11		5 29	20 4		2 5	13 5		2 26	13 9		2 10	12 36																									
S. M.	3	morn.	11 35	11 8		11 55	11 9		5 50	20 8		6 12	20 11		2 47	14 1		3 7	14 4		3 10	12 46																									
Tu. W.	4	0 16	—	—		0 15	11 10		6 33	21 2		6 54	21 4		3 25	14 6		3 45	14 8		3 10	12 56																									
Th. F.	5	1 15	0 36	11 10		0 58	11 10		7 17	21 5		7 39	21 5		4 7	14 10		4 29	14 10		4 10	13 6																									
S. M.	6	2 17	1 20	11 9		1 42	11 8		8 12	21 4		8 23	21 2		4 51	14 8		5 13	14 6		5 10	13 14																									
Tu. W.	7	3 18	2 5	11 6		2 30	11 5		8 47	20 10		9 13	20 5		5 38	14 3		6 4	13 10		6 10	13 24																									
Th. F.	8	4 18	2 56	11 3		3 21	11 0		9 39	19 10		10 5	19 4		6 31	13 6		6 59	13 2		7 10	13 38																									
S. M.	9	5 14	3 46	10 10		4 14	10 7		10 34	18 10		11 8	18 4		7 30	12 9		8 2	12 5		8 10	13 48																									
Tu. W.	10	6 7	4 43	10 5		5 15	10 3		11 45	17 11		—	—		8 35	12 2		9 10	11 11		9 10	12 10																									
Th. F.	11	6 57	5 48	10 2		6 22	10 2		0 24	17 7		1 0	17 4		9 47	11 9		10 22	11 9		10 20	12 20																									
S. M.	12	7 45	7 1	10 2		7 38	10 3		1 32	17 4		2 3	17 5		10 56	11 9		11 27	11 11		11 20	12 30																									
Tu. W.	13	8 33	8 12	10 4		8 44	10 6		2 34	17 9		3 5	18 2		11 57	12 2		—	—		—	—																									
Th. F.	14	9 20	9 13	10 8		9 42	10 10		3 35	18 7		4 2	19 0		0 25	12 6		0 52	12 9		0 50	12 19																									
S. M.	15	10 7	10 10	11 0		10 35	11 1		4 30	19 3		4 53	19 6		1 20	13 0		1 46	13 2		1 40	13 12																									
Tu. W.	16	10 56	10 58	11 2		11 20	11 3		5 15	19 8		5 36	19 10		2 10	13 4		2 32	13 8		2 30	13 18																									
Th. F.	17	11 45	11 41	11 4		—	—		5 57	19 11		6 18	19 11		2 53	13 6		3 12	13 12		3 10	13 22																									
S. M.	18	0 35	0 1	11 4		0 21	11 3		6 39	19 11		6 58	19 10		3 31	13 8		3 50	13 16		3 48	13 26																									
Tu. W.	19	1 25	0 39	11 2		0 58	11 1		7 17	19 9		7 36	19 8		4 8	13 8		4 27	13 17		4 25	13 27																									
Th. F.	20	2 14	1 17	11 0		1 34	10 11		7 53	19 6		8 9	19 4		4 43	13 5		4 59	13 7		4 57	13 17																									
S. M.	21	3 2	1 51	10 9		2 9	10 8		8 26	19 1		8 45	18 10		5 17	13 0		5 36	12 59		5 34	13 9																									
Tu. W.	22	3 48	2 28	10 6		2 46	10 5		9 4	18 6		9 23	18 2		5 56	12 6		6 15	12 3		6 13	12 13																									
Th. F.	23	4 33	3 5	10 3		3 24	10 2		9 42	17 10		10 1	17 6		6 35	12 0		6 57	11 50		6 55	11 60																									
S. M.	24	5 16	3 43	10 0		4 4	9 11		10 24	17 3		10 50	16 11		7 20	11 8		7 44	11 58		7 42	12 8																									
Tu. W.	25	6 0	4 26	9 10		4 51	9 9		11 18	16 8		11 48	16 6		8 10	11 3		8 36	11 56		8 34	12 16																									
Th. F.	26	6 43	5 15	9 8		5 42	9 8		—	—		0 19	16 4		9 5	11 0		9 37	11 54		9 35	12 26																									
S. M.	27	7 28	6 12	9 8		6 50	9 9		0 50	16 3		1 23	16 3		10 13	11 0		10 44	11 52		10 42	12 36																									
Tu. W.	28	8 14	7 25	9 10		7 54	10 0		1 52	16 6		2 19	16 10		11 11	11 4		11 38	11 50		11 36	12 46																									
Th. F.	29	9 5	8 23	10 2		8 53	10 4		2 45	17 3		3 13	17 10		—	—		0 5	11 98		0 3	11 108																									
S. M.	30	9 59	9 20	10 7		9 47	10 10		3 41	18 5		4 8	18 11		0 32	12 4		0 58	12 8		0 56	12 18																									
Tu. W.	31	10 57	10 14	11 0		10 39	11 3		4 33	19 5		4 56	19 11		1 24	13 1		1 51	13 3		1 49	13 13																									
Half Mean Spring Range.			5ft. 9in.						10ft. 5in.						7ft. 2in.																																
Phases of the Moon.																								Moon's Declination at Noon.																							
D. H. M.																								M.D. ° ' M.D. ° ' M.D. ° ' M.D. °																							
Full - - - - 3 2 52 Afternoon.																								1 9 8. 3 9 13 8. 53 17 19 N. 54 25 6 N. 4																							
Last Quarter - 10 7 15 Morning.																								2 13 30 10 9 25 18 21 24 26 2 1																							
New - - - - 17 4 48 Afternoon.																								3 17 19 11 4 31 19 21 54 27 2 8 2																							
First Quarter 25 8 47 Afternoon.																								4 20 8 12 0 N. 30 20 21 22 28 7 1																							
																								5 21 41 13 5 25 21 19 54 29 11 4																							
																								6 21 46 14 10 0 22 17 34 30 15 4																							
In Perigee - - 6 6 0 Morning.																								7 20 21 15 14 4 23 14 30 31 19																							
In Apogee - - 22 2 0 Morning.																								8 17 39 16 17 25 24 10 50																							

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, — for  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.

MAY, 1863.

NORTH SHIELDS.										LEITH.										THURSO.										C's Age at Noon.					
WINDING.										AFTERNOON.					MORNING.					AFTERNOON.					MORNING.						AFTERNOON.				
Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.			D.				
F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.						
11	6	1	51	11	10	0	25	14	3	0	45	14	9	6	44	11	7	7	2	12	1	13	4												
12	3	2	29	12	8	1	4	15	3	1	24	15	8	7	18	12	7	7	36	13	0	14	4												
3	0	3	6	13	3	1	44	16	1	2	4	16	4	7	53	13	4	8	12	13	7	0													
3	5	3	46	13	7	2	24	16	7	2	43	16	9	8	31	13	8	8	53	13	9	16	4												
3	8	4	31	13	7	3	4	16	9	3	26	16	8	9	15	13	8	9	37	13	6	17	4												
3	5	5	17	13	2	3	48	16	6	4	11	16	3	10	1	13	3	10	27	13	0	18	4												
3	0	6	8	12	9	4	36	16	1	5	2	15	9	10	53	12	8	11	21	12	3	19	4												
2	5	7	1	12	1	5	29	15	5	5	57	15	0	11	49	11	10	—	—	—	—	20	4												
1	9	8	6	11	3	6	29	14	6	7	1	14	2	0	20	11	5	0	53	11	0	21	4												
10	11	9	20	10	9	7	37	13	10	8	14	13	6	1	27	10	9	2	5	10	6	0													
10	8	10	34	10	9	8	52	13	5	9	29	13	4	2	44	10	4	3	24	10	3	23	4												
10	10	11	40	11	0	10	2	13	6	10	33	13	8	4	1	10	3	4	34	10	4	24	4												
—		0	11	11	2	11	4	13	10	11	32	14	1	5	6	10	6	5	34	10	9	25	4												
11	5	1	4	11	7	11	58	14	4	—	—	—	—	6	0	11	1	6	24	11	4	26	4												
11	9	1	52	11	11	0	23	14	7	0	46	14	10	6	45	11	8	7	5	12	0	27	4												
12	2	2	35	12	3	1	9	15	1	1	31	15	3	7	23	12	2	7	41	12	5	28	4												
12	5	3	12	12	6	1	51	15	6	2	10	15	7	7	59	12	7	8	18	12	7	0													
12	7	3	50	12	6	2	29	15	8	2	48	15	7	8	36	12	6	8	53	12	5	0	8												
12	5	4	28	12	4	3	5	15	6	3	23	15	4	9	12	12	3	9	29	12	1	1	8												
12	2	5	2	11	11	3	40	15	1	3	57	14	10	9	47	11	10	10	5	11	8	2	8												
11	9	5	40	11	7	4	15	14	8	4	34	14	6	10	25	11	5	10	44	11	2	3	8												
11	5	6	18	11	3	4	53	14	3	5	12	14	11	4	10	11	11	11	25	10	7	4	8												
8	11	0	6	58	10	10	5	33	13	10	5	55	13	7	11	47	10	4	—	—	—	5	8												
2	10	7	7	48	10	4	6	19	13	3	6	43	13	0	0	10	10	2	0	35	9	11	6	8											
5	10	0	8	44	9	11	7	10	12	10	7	39	12	8	1	1	9	9	1	29	9	7	0												
15	9	10	9	50	9	10	8	9	12	7	8	42	12	6	2	0	9	6	2	34	9	6	8	8											
25	9	11	10	56	10	1	9	19	12	7	9	51	12	9	3	12	9	6	3	48	9	7	9	8											
24	10	4	11	52	10	8	10	18	13	0	10	45	13	3	4	17	9	9	4	46	9	11	10	8											
—		0	20	10	11	11	13	13	7	11	39	13	11	5	15	10	2	5	40	10	7	11	8												
45	11	3	1	9	11	6	—	—	—	0	3	14	3	6	5	11	0	6	28	11	6	12	8												
33	11	10	1	57	12	3	0	27	14	9	0	51	15	2	6	49	12	0	7	11	12	6	13	8											
Spring }										6ft. 8in.					8ft. 2in.					6ft. 7in.															

Equation of Time at Noon.

S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
0		9	3 44		17	3 52		25	3 23	
7		10	3 47		18	3 50		26	3 17	
14		11	3 50		19	3 48		27	3 11	
21		12	3 52		20	3 45		28	3 4	
27		13	3 53		21	3 41		29	2 57	
32		14	3 53		22	3 38		30	2 49	
37		15	3 53		23	3 33		31	2 41	
41		16	3 53		24	3 28				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
 NORTH SHIELDS add 6 m. LEITH add 13 m. THURSO add 14 m.

MAY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.			
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.						
F.	1	10a27	10	4	9	1	10	25	9	3	9	25	23	9	9	44	24	5	4	2	18	9	4	25	19	4
S.	2	11 19	10	46	9	5	11	8	9	6	10	3	25	0	10	23	25	7	4	49	20	0	5	13	20	0
Mo.	3	morn.	11	30	9	8	11	52	9	9	10	44	25	11	11	4	26	3	5	35	20	11	5	56	21	0
M.	4	0 16	—	—	—	—	0	14	9	10	11	25	26	7	11	48	26	8	6	17	21	6	6	39	21	0
Tu.	5	1 15	0	37	9	11	1	0	9	11	—	—	—	—	0	11	26	9	7	121	8	7	23	21	0	0
W.	6	2 17	1	23	9	11	1	46	9	11	0	33	26	7	0	56	26	4	7	46	21	3	8	10	21	0
Th.	7	3 18	2	9	9	10	2	33	9	9	1	19	25	11	1	43	25	5	8	35	20	7	9	0	20	0
F.	8	4 18	2	58	9	7	3	23	9	5	2	9	24	9	2	35	24	1	9	25	19	5	9	51	18	11
S.	9	5 14	3	51	9	3	4	20	9	2	3	2	23	6	3	31	22	10	10	18	18	4	10	45	17	1
Mo.	10	6 7	4	50	9	0	5	23	8	10	4	3	22	2	4	38	21	8	11	12	17	2	11	41	16	11
M.	11	6 57	5	56	8	8	6	29	8	7	5	16	21	5	5	54	21	4	—	—	—	—	0	11	16	11
Tu.	12	7 45	7	3	8	7	7	37	8	8	6	33	21	7	7	7	21	11	0	45	16	9	1	24	16	11
W.	13	8 33	8	12	8	9	8	42	8	10	7	40	22	3	8	10	22	9	2	2	17	2	2	35	17	11
Th.	14	9 20	9	12	9	0	9	40	9	1	8	37	23	2	9	3	23	7	3	7	18	1	3	37	18	11
F.	15	10 7	10	6	9	2	10	29	9	2	9	26	23	11	9	48	24	3	4	5	18	10	4	31	19	11
S.	16	10 56	10	52	9	3	11	15	9	3	10	9	24	5	10	29	24	7	4	55	19	5	5	19	19	11
Mo.	17	11 45	11	36	9	3	11	58	9	4	10	50	24	8	11	10	24	8	5	41	19	9	6	2	19	11
M.	18	0a35	—	—	—	—	0	18	9	4	11	30	24	8	11	49	24	7	6	21	19	10	6	40	19	11
Tu.	19	1 25	0	37	9	4	0	57	9	4	—	—	—	—	0	8	24	5	6	58	19	8	7	15	19	11
W.	20	2 14	1	15	9	3	1	31	9	3	0	25	24	3	0	42	24	0	7	32	19	2	7	49	18	11
Th.	21	3 2	1	48	9	2	2	7	9	1	0	59	23	9	1	17	23	3	8	7	18	8	8	26	18	11
F.	22	3 48	2	25	9	0	2	43	8	11	1	35	23	0	1	53	22	7	8	45	18	1	9	3	17	11
S.	23	4 33	3	1	8	10	3	19	8	9	2	11	22	1	2	30	21	9	9	21	17	4	9	41	17	11
Mo.	24	5 16	3	41	8	9	4	4	8	8	2	52	21	5	3	15	21	0	10	2	16	9	10	23	16	11
M.	25	6 0	4	27	8	7	4	50	8	6	3	38	20	7	4	4	20	4	10	44	16	0	11	6	15	11
Tu.	26	6 43	5	17	8	5	5	46	8	4	4	33	20	1	5	6	20	0	11	32	15	7	—	—	—	11
W.	27	7 28	6	20	8	3	6	51	8	3	5	43	20	1	6	19	20	4	0	3	15	7	0	32	15	11
Th.	28	8 14	7	21	8	4	7	50	8	5	6	50	20	9	7	20	21	3	1	3	16	0	1	38	16	11
F.	29	9 5	8	20	8	7	8	49	8	9	7	49	21	10	8	16	22	5	2	12	16	10	2	43	17	11
S.	30	9 59	9	17	8	11	9	44	9	1	8	42	23	1	9	7	23	9	3	13	18	0	3	42	18	11
Mo.	31	10 57	10	11	9	3	10	38	9	5	9	31	24	5	9	55	25	0	4	10	19	4	4	39	19	11
Half Mean Spring Range.			4ft. 10in.								13ft. 0in.								10ft. 6in.							
Phases of the Moon.											Moon's Declination at Noon.															
D. H. M.											M.D. ° ' "															
Full - - - - 3 2 52 Afternoon.											1 9 8. 3 9 13 8. 53 17 19 N. 54 25 6 N. 4															
Last Quarter - 10 7 15 Morning.											2 13 30 10 9 25 18 21 24 26 2 I															
New - - - - 17 4 48 Afternoon.											3 17 19 11 4 31 19 21 54 27 2 8. 2															
First Quarter - 25 8 47 Afternoon.											4 20 8 12 ON. 30 20 21 22 28 7 I															
											5 21 41 13 5 25 21 19 54 29 11 4															
In Perigee - - 6 6 0 Morning.											6 21 46 14 10 0 22 17 34 30 15 4															
In Apogee - - 22 2 0 Morning.											7 20 21 15 14 4 23 14 30 31 19															
											8 17 39 16 17 25 24 10 50															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

MAY, 1863.

WESTON-SUPER-MARE.					HOLYHEAD.					KINGSTOWN.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.	D.	
4 42 33	5	5 7 34	6	8 21 14	8	8 40 15	1	9 17 10	1	9 38 10	4	13 4			
5 31 35	6	5 54 36	5	8 58 15	5	9 18 15	9	9 58 10	7	10 17 10	9	14 4			
6 16 37	0	6 38 37	6	9 37 16	0	9 57 16	3	10 35 10	11	10 54 11	1	○			
7 03 37	11	7 23 38	3	10 17 16	4	10 37 16	5	11 14 11	2	11 36 11	2	16 4			
7 45 38	4	8 7 38	2	10 57 16	5	11 18 16	4	11 58 11	2	—	—	17 4			
8 29 37	11	8 51 37	6	11 42 16	2	—	—	0 21 11	1	0 45 10	11	18 4			
9 14 36	11	9 36 36	1	0 8 15	11	0 35 15	7	1 11 10	10	1 37 10	7	19 4			
9 58 35	2	10 21 34	2	1 3 15	3	1 31 14	10	2 3 10	4	2 31 10	2	20 4			
10 46 33	2	11 12 32	2	2 2 14	5	2 34 14	1	3 1 9	11	3 33 9	9	21 4			
11 43 31	5	—	—	3 8 13	9	3 46 13	6	4 7 9	7	4 44 9	4	○			
0 15 30	10	0 48 30	7	4 25 13	5	5 2 13	5	5 20 9	3	5 52 9	3	23 4			
1 24 30	8	1 59 30	11	5 36 13	7	6 7 13	9	6 23 9	4	6 54 9	6	24 4			
2 34 31	4	3 8 31	11	6 38 13	11	7 6 14	1	7 25 9	8	7 55 9	9	25 4			
3 42 32	6	4 15 33	1	7 33 14	4	7 59 14	7	8 24 9	11	8 53 10	1	26 4			
4 45 33	8	5 12 34	3	8 22 14	9	8 43 14	11	9 19 10	2	9 43 10	3	27 4			
5 36 34	7	6 03 35	0	9 4 15	1	9 24 15	2	10 4 10	4	10 23 10	5	28 4			
6 23 35	2	6 44 35	2	9 43 15	3	10 3 15	3	10 41 10	6	11 0 10	7	●			
7 43 35	2	7 24 35	2	10 21 15	3	10 38 15	2	11 18 10	7	11 36 10	6	0 8			
7 43 35	1	7 59 34	9	10 55 15	0	11 11 14	10	11 55 10	5	—	—	1 8			
8 15 34	5	8 31 34	2	11 27 14	8	11 45 14	6	0 13 10	3	0 31 10	2	2 8			
8 48 33	10	9 6 33	5	—	—	0 5 14	4	0 49 10	1	1 9 9	11	3 8			
9 22 32	11	9 38 32	4	0 26 14	2	0 46 13	11	1 28 9	9	1 47 9	7	4 8			
9 54 31	9	10 11 31	2	1 7 13	8	1 28 13	5	2 7 9	6	2 28 9	4	5 8			
10 30 30	7	10 50 30	0	1 52 13	2	2 16 13	0	2 51 9	3	3 15 9	2	6 8			
11 11 29	5	11 37 29	1	2 42 12	9	3 10 12	8	3 40 9	0	4 9 8	11	7 8			
—	—	0 6 28	9	3 41 12	7	4 15 12	6	4 39 8	10	5 10 8	10	8 8			
0 39 28	9	1 11 29	0	4 52 12	7	5 24 12	10	5 43 8	10	6 13 8	11	9 8			
1 41 29	5	2 12 29	11	5 52 13	1	6 19 13	4	6 39 9	1	7 6 9	4	10 8			
2 44 30	8	3 17 31	6	6 47 13	7	7 13 13	11	7 34 9	6	8 2 9	8	11 8			
3 49 32	4	4 20 33	3	7 38 14	4	8 3 14	8	8 29 9	11	8 57 10	1	12 8			
4 51 34	5	5 21 35	5	8 27 15	1	8 50 15	5	9 24 10	4	9 50 10	6	13 8			
Mean Spring } Range.		18ft. 7in.			8ft. 0in.			5ft. 6in.							

Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
3 0		9	3 44		17	3 52		25	3 23	
3 7		10	3 47		18	3 50		26	3 17	
3 14		11	3 50		19	3 48		27	3 11	
3 21		12	3 52		20	3 45		28	3 4	
3 27		13	3 53		21	3 41		29	2 57	
3 32		14	3 53		22	3 38		30	2 49	
3 37		15	3 53		23	3 33		31	2 41	
3 41		16	3 53		24	3 28				

as of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 13 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

MAY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
F.	1	10 27	9 55	8 11	9 14	9 1	6 5	7 0	6 24	7 3	3 24	10 0	3 42	
S.	2	11 19	9 33	9 3	9 53	9 5	6 44	7 5	7 6	7 7	4 0	10 8	4 20	
S.	3	morn.	10 13	9 6	10 33	9 7	7 27	7 9	7 47	7 10	4 40	11 2	5 1	
M.	4	0 16	10 53	9 7	11 14	9 7	8 7	7 11	8 28	8 0	5 22	11 6	5 44	
Tu.	5	1 15	11 35	9 7	11 56	9 6	8 48	7 11	9 8	7 10	6 5	11 6	6 26	
W.	6	2 17	—	—	0 21	9 6	9 30	7 8	9 52	7 6	6 50	11 2	7 15	
Th.	7	3 18	0 47	9 5	1 13	9 4	10 16	7 3	10 42	7 1	7 40	10 7	8 5	
F.	8	4 18	1 42	9 2	2 12	9 0	11 10	6 10	11 47	6 6	8 32	9 11	9 3	
S.	9	5 14	2 44	8 10	3 16	8 8	—	—	0 28	6 3	9 39	9 4	10 16	
S.	10	6 7	3 50	8 7	4 25	8 6	1 10	6 1	1 55	5 11	10 55	9 0	11 33	
M.	11	6 57	5 1	8 5	5 34	8 4	2 37	6 0	3 11	6 2	—	—	0 7	
Tu.	12	7 45	6 6	8 4	6 39	8 4	3 42	6 5	4 10	6 7	0 40	9 0	1 12	
W.	13	8 33	7 12	8 5	7 40	8 6	4 35	6 8	4 58	6 10	1 44	9 3	2 13	
Th.	14	9 20	8 6	8 8	8 32	8 10	5 20	6 11	5 43	7 0	2 38	9 8	3 3	
F.	15	10 7	8 56	8 11	9 18	9 0	6 6	7 1	6 29	7 2	3 25	10 1	3 46	
S.	16	10 56	9 40	9 1	10 0	9 2	6 51	7 3	7 12	7 3	4 6	10 5	4 26	
S.	17	11 45	10 19	9 2	10 38	9 3	7 33	7 3	7 53	7 3	4 46	10 8	5 7	
M.	18	0 35	10 57	9 2	11 15	9 2	8 11	7 4	8 28	7 3	5 27	10 8	5 45	
Tu.	19	1 25	11 33	9 1	11 49	9 0	8 44	7 2	9 0	7 1	6 3	10 6	6 18	
W.	20	2 14	—	—	0 6	9 0	9 16	6 11	9 32	6 9	6 36	10 2	6 54	
Th.	21	3 2	0 25	8 11	0 45	8 10	9 49	6 7	10 7	6 6	7 13	9 9	7 31	
F.	22	3 48	1 4	8 9	1 25	8 8	10 26	6 4	10 45	6 2	7 49	9 3	8 8	
S.	23	4 33	1 47	8 7	2 10	8 6	11 9	6 0	11 37	5 10	8 29	8 10	8 53	
S.	24	5 16	2 34	8 5	2 59	8 4	—	—	0 8	5 8	9 21	8 6	9 49	
M.	25	6 0	3 24	8 3	3 51	8 2	0 40	5 6	1 13	5 6	10 19	8 4	10 50	
Tu.	26	6 43	4 20	8 1	4 51	8 1	1 49	5 6	2 27	5 7	11 23	8 3	11 58	
W.	27	7 28	5 25	8 1	5 55	8 1	3 2	5 8	3 32	5 11	—	—	0 28	
Th.	28	8 14	6 22	8 2	6 51	8 3	3 56	6 2	4 20	6 4	0 56	8 8	1 24	
F.	29	9 5	7 20	8 4	7 47	8 5	4 43	6 6	5 4	6 9	1 52	9 1	2 15	
S.	30	9 59	8 12	8 8	8 36	8 10	5 25	6 11	5 47	7 1	2 44	9 8	3 7	
S.	31	10 57	9 0	9 1	9 25	9 3	6 10	7 3	6 37	7 5	3 29	10 4	3 52	
Half Mean Spring } Range.			4ft. 9in.				3ft. 10in.				5ft. 7in.			
Phases of the Moon.							Moon's Declination at Noon.							
			D.	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°
Full	—	—	3	2	52	Afternoon.	1	9	8. 3	9	13	8. 53	17	19 N. 54
Last Quarter	—	—	10	7	15	Morning.	2	13	30	10	9	25	18	21 24
New	—	—	17	4	48	Afternoon.	3	17	19	11	4	31	19	21 54
First Quarter	—	—	25	8	47	Afternoon.	4	20	8	12	0	N. 30	20	21 22
							5	21	41	13	5	25	21	19 54
In Perigee	—	—	6	6	0	Morning.	6	21	46	14	10	0	22	17 34
In Apogee	—	—	22	2	0	Morning.	7	20	21	15	14	4	23	14 30
							8	17	39	16	17	25	24	10 50

The times for High Water are given for Mean Time at Place ; if Dublin or Railway Time be requi

BELFAST subtract 2 m.

LONDONDERRY add 4 m.

SLIGO BAY add 9

MAY, 1863.

LUNAR DATE.	GALWAY.								QUEENSTOWN.								WATERFORD.								D. Age at Noon.	
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.					
	Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.			
	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.		
1	2	39	13	1	3	0	13	7	2	56	10	7	3	18	10	11	3	11	11	4	3	36	11	8	13.4	
2	3	20	14	0	3	40	14	4	3	40	11	2	4	3	11	6	3	59	11	11	4	23	12	3	14.4	
3	4	0	14	8	4	20	14	11	4	23	11	8	4	44	11	11	4	46	12	5	5	7	12	6	○	
4	4	40	15	2	5	2	15	4	5	6	12	0	5	29	12	1	5	28	12	7	5	50	12	9	16.4	
5	5	25	15	4	5	48	15	2	5	52	12	1	6	15	12	0	6	13	12	9	6	36	12	9	17.4	
6	6	12	15	0	6	36	14	9	6	38	11	11	7	2	11	9	6	59	12	8	7	23	12	7	18.4	
7	7	2	14	5	7	28	14	0	7	26	11	6	7	50	11	3	7	47	12	5	8	10	12	2	19.4	
8	7	56	13	7	8	26	13	0	8	15	11	0	8	41	10	8	8	34	11	11	8	59	11	8	20.4	
9	8	57	12	6	9	29	12	1	9	9	10	4	9	37	10	1	9	24	11	5	9	53	11	12	21.4	
10	10	4	11	10	10	41	11	9	10	7	9	11	10	40	9	9	10	27	10	10	11	1	10	7	○	
11	11	17	11	9	11	52	11	10	11	14	9	8	11	49	9	9	11	33	10	6	—	—	—	—	23.4	
2	—	—	—	—	0	24	12	0	—	—	—	—	0	23	9	10	0	4	10	5	0	35	10	7	24.4	
3	0	55	12	3	1	23	12	6	0	58	9	11	1	32	10	1	1	7	10	8	1	40	10	10	25.4	
4	1	49	12	9	2	16	13	0	2	3	10	4	2	32	10	6	2	13	11	1	2	45	11	3	26.4	
5	2	41	13	3	3	5	13	5	2	59	10	8	3	23	10	10	3	14	11	5	3	41	11	7	27.4	
6	3	26	13	7	3	46	13	9	3	46	10	11	4	8	11	1	4	6	11	8	4	30	11	9	28.4	
7	4	6	13	10	4	26	13	11	4	29	11	2	4	50	11	2	4	52	11	10	5	13	11	10	●	
8	4	45	13	11	5	4	13	11	5	10	11	2	5	30	11	2	5	32	11	9	5	50	11	9	0.8	
9	5	23	13	10	5	40	13	8	5	50	11	1	6	7	11	0	6	9	11	9	6	27	11	8	1.8	
10	5	57	13	5	6	15	13	3	6	24	10	10	6	41	10	9	6	44	11	7	7	2	11	6	2.8	
1	6	34	13	0	6	53	12	9	7	0	10	7	7	18	10	5	7	21	11	5	7	38	11	4	3.8	
2	7	12	12	6	7	32	12	3	7	36	10	3	7	53	10	1	7	55	11	2	8	12	11	1	4.8	
3	7	53	12	0	8	16	11	8	8	11	9	11	8	31	9	9	8	30	10	11	8	49	10	9	5.8	
4	8	40	11	4	9	5	11	1	8	53	9	7	9	15	9	5	9	8	10	7	9	29	10	5	6.8	
5	9	30	10	11	9	59	10	9	9	37	9	3	10	1	9	2	9	53	10	3	10	22	10	1	7.8	
6	10	31	10	9	11	7	10	10	10	30	9	1	11	5	9	10	10	52	10	0	11	25	9	11	8.8	
7	11	40	11	0	—	—	—	—	11	37	9	2	—	—	—	—	11	54	9	11	—	—	—	—	—	9.8
8	0	8	11	3	0	36	11	7	0	6	9	4	0	37	9	6	0	20	10	1	0	47	10	3	10.8	
9	1	4	11	11	1	30	12	4	1	8	9	9	1	39	10	0	1	17	10	6	1	48	10	9	11.8	
10	1	55	12	9	2	21	13	2	2	8	10	3	2	36	10	7	2	19	11	1	2	50	11	4	12.8	
11	2	46	13	7	3	11	13	11	3	4	10	11	3	31	11	2	3	20	11	8	3	50	11	11	13.8	
Mean Spring Range. }				7ft. 5in.				5ft. 10in.				6ft. 2in.														

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
3 0		9	3 44		17	3 52		25	3 23	
3 7		10	3 47		18	3 50		26	3 17	
3 14		11	3 50		19	3 48		27	3 11	
3 21		12	3 52		20	3 45		28	3 4	
3 27		13	3 53		21	3 41		29	2 57	
3 32		14	3 53		22	3 38		30	2 49	
3 37		15	3 53		23	3 33		31	2 41	
3 41		16	3 53		24	3 28				

Times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.

JUNE, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.								DEVONPORT.								PORTSMOUTH.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.			
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.						
		H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.							
M.	1	11 59	2 45 18 8	3 9 19 2	4 38 15 1	5 3 15 6	10 41 12 6	11 6 1																		
Tu.	2	morn.	3 33 19 5	3 58 19 7	5 27 15 6	5 51 15 11	11 29 12 10	11 54 1																		
W.	3	1 2	4 23 19 7	4 46 19 8	6 16 15 8	6 43 16 3	—	—																		
Th.	4	2 5	5 10 19 7	5 35 19 5	7 6 15 8	7 27 16 2	0 45 12 11	1 10 1																		
F.	5	3 5	6 1 19 1	6 26 18 9	7 50 15 5	8 15 15 11	1 37 12 9	2 11 1																		
S.	6	4 1	6 52 18 3	7 18 17 7	8 41 14 11	9 6 15 4	2 27 12 6	2 53 1																		
S.	7	4 53	7 47 17 0	8 14 16 5	9 29 14 2	9 54 14 6	3 19 12 1	3 46 1																		
M.	8	5 43	8 42 15 10	9 10 15 6	10 18 13 4	10 47 13 9	4 11 11 7	4 39 1																		
Tu.	9	6 31	9 40 15 2	10 13 15 0	11 15 12 10	11 46 13 2	5 6 11 0	5 34 1																		
W.	10	7 18	10 47 14 11	11 20 14 11	—	—	6 5 10 8	6 36 1																		
Th.	11	8 5	11 54 14 11	—	—	0 57 13 1	1 33 12 11	7 41 1																		
F.	12	8 53	0 26 15 1	0 56 15 4	2 6 13 2	2 38 13 3	8 15 10 10	8 47 1																		
S.	13	9 41	1 26 15 7	1 50 15 11	3 8 13 5	3 36 13 9	9 18 11 2	9 44 1																		
S.	14	10 31	2 13 16 3	2 35 16 7	4 1 13 10	4 24 14 3	10 8 11 5	10 31 1																		
M.	15	11 20	2 57 16 10	3 18 17 1	4 48 14 2	5 9 14 7	10 53 11 7	11 14 1																		
Tu.	16	0 8 9	3 37 17 2	3 55 17 2	5 30 14 3	5 49 14 9	11 33 11 8	11 51 1																		
W.	17	0 58	4 14 17 2	4 32 17 2	6 6 14 3	6 24 14 11	—	—																		
Th.	18	1 45	4 49 17 2	5 6 17 1	6 41 14 3	6 56 14 10	0 29 11 8	0 48 1																		
F.	19	2 30	5 23 17 0	5 40 16 11	7 12 14 0	7 28 14 8	1 6 11 7	1 23 1																		
S.	20	3 14	5 57 16 9	6 14 16 7	7 43 13 8	8 0 14 3	1 41 11 7	1 57 1																		
S.	21	3 56	6 32 16 4	6 51 16 1	8 16 13 3	8 31 13 9	2 15 11 5	2 34 1																		
M.	22	4 39	7 11 15 10	7 32 15 6	8 47 12 10	9 4 13 3	2 52 11 3	3 12 1																		
Tu.	23	5 22	7 53 15 2	8 17 14 10	9 25 12 6	9 45 12 10	3 32 11 0	3 51 1																		
W.	24	6 7	8 41 14 7	9 8 14 5	10 9 12 3	10 35 12 6	4 14 10 9	4 38 1																		
Th.	25	6 54	9 36 14 4	10 9 14 4	11 2 12 1	11 35 12 4	5 4 10 6	5 30 1																		
F.	26	7 44	10 44 14 5	11 19 14 8	—	—	6 1 10 4	6 33 1																		
S.	27	8 39	11 54 15 0	—	—	0 51 12 7	1 29 12 10	7 41 1																		
S.	28	9 39	0 27 15 6	0 59 16 1	2 6 13 1	2 41 13 6	8 16 11 0	8 50 1																		
M.	29	10 41	1 31 16 8	1 59 17 5	3 15 13 10	3 46 14 3	9 23 11 8	9 54 1																		
Tu.	30	11 45	2 27 18 1	2 53 18 10	4 17 14 8	4 45 15 4	10 22 12 3	10 49 1																		
Half Mean Spring Range.			9ft. 6in.								7ft. 9in.								6ft. 4in.							
Phases of the Moon.										Moon's Declination at Noon.																
D. H. M.										M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°						
Full - - - -										1	21	8.13	9	4	N.20	17	20	N.25	25	10						
Last Quarter -										2	21	54	10	9	1	18	18	18	26	1						
New - - - -										3	21	1	11	13	11	19	15	27	27	1						
First Quarter -										4	18	40	12	16	40	20	11	57	28	20						
										5	15	6	13	19	21	21	7	58	29	2						
In Perigee - -										6	10	40	14	21	7	22	3	37	30	2						
In Apogee - -										7	5	45	15	21	52	23	0	56								
										8	0	39	16	21	38	24	5	33								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 Brest add 18 m. | Devonport add 17 m. | Portsmouth add 4 m.



## JUNE, 1863.

MORNING.	DOVER.				MORNING.	SHEERNESS.				MORNING.	LONDON.				C's Age at Noon.												
	MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.														
	Time.		Height.			Time.		Height.			Time.		Height.														
	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.																		
1	10	8	18	3	10	34	18	8	11	53	15	9	—	—	0	58	18	0	1	23	18	4	0	15	8		
2	11	0	18	11	11	27	19	1	0	18	16	0	0	43	16	2	1	47	18	8	2	10	19	0	15	8	
3	11	53	19	1	—	—	—	—	1	7	16	4	1	30	16	5	2	35	19	3	2	58	19	5	16	8	
4	0	19	19	2	0	45	19	2	1	55	16	5	2	18	16	5	3	24	19	6	3	47	19	7	17	8	
5	1	13	19	1	1	41	18	11	2	41	16	4	3	5	16	3	4	11	19	6	4	35	19	5	18	8	
6	2	7	18	8	2	34	18	3	3	30	16	0	3	56	15	9	5	0	19	3	5	25	19	0	19	8	
7	3	0	17	10	3	27	17	5	4	22	15	6	4	49	15	2	5	51	18	9	6	18	18	5	20	8	
8	3	53	16	11	4	20	16	5	5	17	14	10	5	45	14	6	6	46	18	0	7	15	17	8	—	—	
9	4	45	16	1	5	10	15	8	6	17	14	3	6	48	14	0	7	44	17	4	8	15	17	1	22	8	
0	5	36	15	5	6	5	15	3	7	20	13	10	7	54	13	9	8	49	16	11	9	24	16	9	23	8	
1	6	34	15	4	7	7	15	6	8	27	13	9	8	59	13	11	9	54	16	7	10	25	16	7	24	8	
2	7	41	15	8	8	12	15	10	9	32	14	0	10	2	14	2	10	58	16	7	11	30	16	8	25	8	
3	8	41	16	1	9	7	16	3	10	32	14	4	11	0	14	5	12	0	16	9	—	—	—	—	—	26	8
4	9	31	16	5	9	55	16	8	11	24	14	7	11	46	14	8	0	29	16	11	0	53	17	1	27	8	
5	10	19	16	10	10	42	17	0	—	—	—	—	0	8	14	10	1	16	17	3	1	39	17	5	28	8	
6	11	3	17	1	11	24	17	1	0	30	14	11	0	51	15	0	2	0	17	7	2	18	17	8	—	—	
7	11	44	17	1	—	—	—	—	1	10	15	1	1	28	15	1	2	38	17	10	2	58	17	11	1	2	
8	0	3	17	2	0	22	17	2	1	47	15	1	2	3	15	0	3	16	17	11	3	34	18	0	2	2	
9	0	41	17	2	1	0	17	1	2	20	15	0	2	37	14	11	3	51	18	0	4	7	18	0	3	2	
0	1	18	17	1	1	37	17	0	2	53	14	11	3	9	14	10	4	24	17	11	4	41	17	10	4	2	
1	1	55	16	11	2	14	16	9	3	26	14	8	3	44	14	7	4	58	17	9	5	16	17	8	5	2	
2	2	34	16	7	2	53	16	5	4	3	14	5	4	22	14	3	5	34	17	7	5	53	17	5	6	2	
3	3	13	16	2	3	33	15	11	4	42	14	1	5	2	13	11	6	13	17	3	6	33	17	1	7	2	
4	3	55	15	8	4	18	15	5	5	25	13	10	5	50	13	8	6	55	16	11	7	18	16	9	—	—	
5	4	42	15	2	5	6	15	0	6	16	13	6	6	46	13	4	7	44	16	7	8	13	16	5	9	2	
6	5	33	14	11	6	2	14	11	7	16	13	4	7	50	13	5	8	44	16	4	9	18	16	3	10	2	
7	6	34	15	2	7	7	15	7	8	25	13	6	8	59	13	9	9	50	16	3	10	25	16	5	11	2	
8	7	42	16	0	8	15	16	6	9	32	14	1	10	3	14	4	11	0	16	7	11	33	16	10	12	2	
9	8	46	16	11	9	17	17	5	10	34	14	9	11	5	15	1	—	—	—	0	2	17	2	13	2	—	—
0	9	46	17	11	10	15	18	5	11	32	15	4	11	59	15	9	0	33	17	6	1	0	18	0	14	2	
If Mean Spring Range.				9ft. 4in.				8ft. 0in.				9ft. 7in.															

## Equation of Time at Noon.

M.	S.	Add.	M.	D.	M.	S.	Add.	M.	D.	M.	S.	Sub.	M.	D.	M.	S.	Sub.
2	32		9		1	11		17		0	28		25		2	12	
2	23		10		0	59		18		0	41		26		2	25	
2	14		11		0	47		19		0	54		27		2	37	
2	4		12		0	35		20		1	7		28		2	50	
1	54		13		0	23		21		1	20		29		3	2	
1	44		14		0	10		22		1	33		30		3	14	
1	33		15		0	3	Sub.	23		1	46						
1	22		16		0	15		24		1	59						

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

DOVER subtract 5 m.

SHEERNESS subtract 3 m.

LONDON 0 m.



JUNE, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTER.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.							
M.	1	11a59	11	5	11	5	11	31	11	7	5	22	20	3	5	47	20	8	2	18	13	9	2	43	1		
Tu.	2	morn.	11	56	11	9	—	—	—	—	6	12	20	11	6	37	21	2	3	7	14	3	3	30	1		
W.	3	1	2	0	20	11	10	0	43	11	10	7	2	21	4	7	27	21	4	3	53	14	8	4	17	1	
Th.	4	2	5	1	8	11	9	1	32	11	8	7	51	21	5	8	14	21	4	4	40	14	10	5	4	1	
F.	5	3	5	1	56	11	7	2	22	11	6	8	40	21	2	9	6	20	10	5	30	14	5	5	57	1	
S.	6	4	1	2	48	11	5	3	14	11	3	9	32	20	5	9	58	20	0	6	23	13	11	6	51	1	
S.	7	4	53	3	40	11	1	4	5	10	10	10	24	19	6	10	53	19	0	7	20	13	3	7	49	1	
M.	8	5	43	4	32	10	8	4	59	10	6	11	25	18	7	12	0	18	2	8	18	12	7	8	48	1	
Tu.	9	6	31	5	28	10	5	5	56	10	3	—	—	—	—	0	33	17	10	9	19	12	1	9	51	1	
W.	10	7	18	6	26	10	2	7	1	10	2	1	4	17	6	1	33	17	5	10	24	11	9	10	55	1	
Th.	11	8	5	7	36	10	2	8	7	10	3	2	3	17	4	2	31	17	6	11	24	11	9	11	53	1	
F.	12	8	53	8	39	10	4	9	9	10	5	3	1	17	8	3	31	17	11	—	—	—	—	0	21	1	
S.	13	9	41	9	39	10	6	10	9	10	7	4	1	18	2	4	29	18	5	0	51	12	2	1	19	1	
S.	14	10	31	10	35	10	8	10	57	10	9	4	53	18	7	5	14	18	9	1	45	12	6	2	9	1	
M.	15	11	20	11	20	10	10	11	43	11	0	5	36	18	11	5	59	19	0	2	32	12	9	2	55	1	
Tu.	16	0	a9	—	—	0	4	10	11	6	21	19	1	6	41	19	2	3	15	13	0	3	33	1	0	33	1
W.	17	0	58	0	23	10	11	0	41	10	11	6	59	19	3	7	18	19	2	3	51	13	2	4	9	1	
Th.	18	1	45	0	59	10	10	1	17	10	10	7	36	19	2	7	54	19	2	4	26	13	3	4	43	1	
F.	19	2	30	1	35	10	9	1	52	10	8	8	11	19	2	8	27	19	1	5	0	13	1	5	17	1	
S.	20	3	14	2	9	10	8	2	26	10	7	8	44	19	0	9	2	18	9	5	34	12	11	5	52	1	
S.	21	3	56	2	44	10	6	3	2	10	5	9	20	18	7	9	39	18	4	6	11	12	7	6	31	1	
M.	22	4	39	3	21	10	4	3	39	10	3	9	57	18	2	10	17	17	11	6	52	12	3	7	13	1	
Tu.	23	5	22	3	58	10	3	4	18	10	2	10	38	17	8	11	2	17	6	7	34	12	0	7	57	1	
W.	24	6	7	4	38	10	1	5	2	10	0	11	30	17	3	11	59	17	0	8	22	11	8	8	48	1	
Th.	25	6	54	5	27	9	11	5	54	9	11	—	—	—	—	0	30	16	10	9	17	11	5	9	47	1	
F.	26	7	44	6	22	9	11	6	57	9	11	1	0	16	9	1	30	16	9	10	20	11	4	10	52	1	
S.	27	8	39	7	33	10	0	8	7	10	2	2	0	16	11	2	31	17	3	11	24	11	7	11	53	1	
S.	28	9	39	8	39	10	4	9	11	10	6	3	1	17	9	3	32	18	3	—	—	—	—	0	22	1	
M.	29	10	41	9	42	10	9	10	14	11	0	4	3	18	10	4	34	19	4	0	53	12	8	1	24	1	
Tu.	30	11	45	10	43	11	3	11	11	11	5	5	1	19	10	5	28	20	4	1	54	13	5	2	23	1	
Half Mean Spring Range.			5ft. 9in.								10ft. 5in.								7ft. 2in.								
Phases of the Moon.												Moon's Declination at Noon.															
D. H. M.												M. D. ° ' "															
Full	-	-	-	1	11	30	Afternoon.	1	21	8	13	9	4	N. 20	17	20	N. 25	25	10								
Last Quarter	-	8	1	52	Afternoon.	2	21	54	10	9	1	18	18	18	18	18	18	26	14								
New	-	-	-	16	7	36	Morning.	3	21	1	11	13	11	19	15	27	17	27	17								
First Quarter	-	24	10	31	Morning.	4	18	40	12	16	40	20	11	57	28	20											
In Perigee	-	3	7	0	Morning.	5	15	6	13	19	21	21	7	58	29	21											
In Apogee	-	18	2	0	Afternoon.	6	10	40	14	21	7	22	3	37	30	21											
						7	5	45	15	21	52	23	0	S. 56													
						8	0	39	16	21	38	24	5	33													

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.

JUNE, 1863.

NORTH SHIELDS.						LEITH.						THURSO.						C's Ag at Noon
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		
2 21 12 7	2 44 12 11		1 16 15 7	1 41 16 0		7 32 13 0	7 54 13 4		0 7 32 13 0	0 7 54 13 4		0 7 32 13 0	0 7 54 13 4		0 7 32 13 0	0 7 54 13 4		
3 7 13 2	3 29 13 5		2 5 16 4	2 28 16 7		8 16 13 7	8 39 13 8		1 8 16 13 7	1 8 39 13 8		1 8 16 13 7	1 8 39 13 8		1 8 16 13 7	1 8 39 13 8		
3 54 13 7	4 18 13 7		2 51 16 8	3 14 16 8		9 3 13 8	9 27 13 7		2 9 3 13 8	2 9 27 13 7		2 9 3 13 8	2 9 27 13 7		2 9 3 13 8	2 9 27 13 7		
4 42 13 6	5 7 13 4		3 38 16 7	4 3 16 5		9 52 13 5	10 19 13 3		3 9 52 13 5	3 10 19 13 3		3 9 52 13 5	3 10 19 13 3		3 9 52 13 5	3 10 19 13 3		
5 34 13 2	6 1 13 0		4 29 16 3	4 55 16 10		10 46 13 0	11 13 12 8		4 10 46 13 0	4 11 13 12 8		4 10 46 13 0	4 11 13 12 8		4 10 46 13 0	4 11 13 12 8		
6 27 12 10	6 54 12 7		5 21 15 10	5 49 15 6		11 41 12 4	—		5 11 41 12 4	5 —		5 11 41 12 4	5 —		5 11 41 12 4	5 —		
7 21 12 3	7 52 11 10		6 18 15 1	6 47 14 8		0 10 11 11	0 40 11 6		6 0 10 11 11	6 0 40 11 6		6 0 10 11 11	6 0 40 11 6		6 0 10 11 11	6 0 40 11 6		
8 23 11 5	8 56 11 1		7 17 14 4	7 50 14 0		1 9 11 3	1 41 10 11		7 1 9 11 3	7 1 41 10 11		7 1 9 11 3	7 1 41 10 11		7 1 9 11 3	7 1 41 10 11		
9 29 10 11	10 3 10 9		8 23 13 9	8 55 13 6		2 14 10 8	2 47 10 6		8 2 14 10 8	8 2 47 10 6		8 2 14 10 8	8 2 47 10 6		8 2 14 10 8	8 2 47 10 6		
10 36 10 9	11 7 10 9		9 29 13 5	10 1 13 5		3 24 10 4	4 0 10 3		9 3 24 10 4	9 4 0 10 3		9 3 24 10 4	9 4 0 10 3		9 3 24 10 4	9 4 0 10 3		
11 36 10 10	—		10 29 13 5	10 59 13 6		4 31 10 2	5 2 10 2		10 4 31 10 2	10 5 2 10 2		10 4 31 10 2	10 5 2 10 2		10 4 31 10 2	10 5 2 10 2		
0 6 10 10	0 35 10 11		11 28 13 7	11 57 13 9		5 30 10 3	5 59 10 5		0 5 30 10 3	0 5 59 10 5		0 5 30 10 3	0 5 59 10 5		0 5 30 10 3	0 5 59 10 5		
1 3 11 0	1 29 11 2		—	0 23 13 11		6 24 10 8	6 45 10 11		1 0 23 13 11	1 6 24 10 8		1 0 23 13 11	1 6 45 10 11		1 0 23 13 11	1 6 45 10 11		
1 52 11 3	2 13 11 6		0 46 14 1	1 8 14 4		7 5 11 2	7 24 11 6		1 1 8 14 4	1 7 5 11 2		1 1 8 14 4	1 7 24 11 6		1 1 8 14 4	1 7 24 11 6		
2 35 11 8	2 56 11 10		1 31 14 7	1 53 14 9		7 43 11 9	8 2 11 11		2 1 53 14 9	2 7 43 11 9		2 1 53 14 9	2 8 2 11 11		2 1 53 14 9	2 8 2 11 11		
3 15 11 11	3 33 12 0		2 13 14 11	2 32 15 0		8 20 12 0	8 37 12 0		3 2 32 15 0	3 8 20 12 0		3 2 32 15 0	3 8 37 12 0		3 2 32 15 0	3 8 37 12 0		
3 51 12 1	4 10 12 0		2 49 15 1	3 7 15 0		8 55 11 11	9 12 11 11		4 3 7 15 0	4 8 55 11 11		4 3 7 15 0	4 9 12 11 11		4 3 7 15 0	4 9 12 11 11		
4 27 12 0	4 45 11 11		3 23 14 11	3 41 14 10		9 30 11 10	9 47 11 9		5 4 27 12 0	5 9 30 11 10		5 4 27 12 0	5 9 47 11 9		5 4 27 12 0	5 9 47 11 9		
5 3 11 10	5 21 11 9		3 58 14 9	4 15 14 8		10 5 11 8	10 23 11 6		6 5 3 11 10	6 10 5 11 8		6 5 3 11 10	6 10 23 11 6		6 5 3 11 10	6 10 23 11 6		
5 38 11 8	5 57 11 7		4 33 14 7	4 51 14 6		10 42 11 4	11 0 11 2		7 5 38 11 8	7 10 42 11 4		7 5 38 11 8	7 11 0 11 2		7 5 38 11 8	7 11 0 11 2		
6 15 11 6	6 34 11 4		5 9 14 4	5 29 14 3		11 21 11 0	11 42 10 10		8 6 15 11 6	8 11 21 11 0		8 6 15 11 6	8 11 42 10 10		8 6 15 11 6	8 11 42 10 10		
6 54 11 3	7 14 11 1		5 50 14 1	6 11 13 11		—	0 3 10 8		9 6 54 11 3	9 7 14 11 1		9 6 54 11 3	9 0 3 10 8		9 6 54 11 3	9 0 3 10 8		
7 36 10 11	8 1 10 8		6 33 13 8	6 56 13 6		0 24 10 6	0 48 10 4		10 7 36 10 11	10 8 1 10 8		10 7 36 10 11	10 0 48 10 4		10 7 36 10 11	10 0 48 10 4		
8 28 10 5	8 55 10 4		7 22 13 3	7 50 13 1		1 14 10 2	1 40 10 0		11 8 28 10 5	11 9 55 10 4		11 8 28 10 5	11 1 40 10 0		11 8 28 10 5	11 1 40 10 0		
9 27 10 3	9 59 10 3		8 20 13 0	8 51 12 11		2 11 9 11	2 43 9 10		12 9 27 10 3	12 10 59 10 3		12 9 27 10 3	12 2 43 9 10		12 9 27 10 3	12 2 43 9 10		
10 32 10 3	11 4 10 5		9 26 12 11	9 59 13 1		3 20 9 10	3 57 9 11		1 10 32 10 3	1 11 4 10 5		1 10 32 10 3	1 3 57 9 11		1 10 32 10 3	1 3 57 9 11		
11 37 10 8	—		10 30 13 3	11 0 13 6		4 30 10 0	5 2 10 3		2 11 37 10 8	2 —		2 5 2 10 3	2 5 2 10 3		2 11 37 10 8	2 5 2 10 3		
0 7 10 11	0 36 11 2		11 29 13 10	11 59 14 2		5 31 10 6	6 1 10 11		3 0 7 10 11	3 0 36 11 2		3 5 31 10 6	3 6 1 10 11		3 0 7 10 11	3 6 1 10 11		
1 5 11 6	1 33 11 10		—	0 27 14 8		6 28 11 5	6 53 12 0		4 1 5 11 6	4 1 33 11 10		4 6 28 11 5	4 6 53 12 0		4 1 5 11 6	4 6 53 12 0		
2 0 12 2	2 26 12 8		0 54 15 2	1 22 15 8		7 16 12 6	7 39 13 1		5 2 0 12 2	5 2 26 12 8		5 7 16 12 6	5 7 39 13 1		5 2 0 12 2	5 7 39 13 1		
If Mean Spring } 6ft. 8in. Range.						8ft. 2in.						6ft. 7in.						

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
2 32	Add.	9	1 11	Add.	17	0 28	Sub.	25	2 12	Sub.
2 23		10	0 59		18	0 41		26	2 25	
2 14		11	0 47		19	0 54		27	2 37	
2 4		12	0 35		20	1 7		28	2 50	
1 54		13	0 23		21	1 20		29	3 2	
1 44		14	0 10		22	1 33		30	3 14	
1 33		15	0 3	Sub.	23	1 46				
1 22		16	0 15		24	1 59				

Notes of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

NORTH SHIELDS add 6 m.

LEITH add 13 m.

THURSO add 14 m.

JUNE, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.									
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.						
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.					
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.		
M.	1	11 59	11	4	9	5	11	31	9	7	10	19	25	6	10	44	25	10	5	8	20	5	5	35
Tu.	2	morn.	11	57	9	9	—	—	11	8	26	3	11	33	26	6	6	0	21	3	6	25	—	—
W.	3	1 2	0	22	9	10	0	47	9	11	11	59	26	7	—	—	6	50	21	7	7	13	—	—
Th.	4	2 5	1	12	9	11	1	37	9	11	0	23	26	8	0	47	26	7	7	37	21	6	8	2
F.	5	3 5	2	2	9	11	2	27	9	10	1	12	26	4	1	37	25	11	8	28	21	0	8	54
S.	6	4 1	2	52	9	9	3	17	9	8	2	25	5	2	28	24	11	9	19	20	2	9	43	—
So.	7	4 53	3	42	9	6	4	8	9	4	2	53	24	4	3	20	23	9	10	8	19	1	10	33
M.	8	5 43	4	35	9	3	5	3	9	1	3	47	23	1	4	17	22	6	10	58	18	0	11	21
Tu.	9	6 31	5	31	8	11	6	0	8	9	4	47	22	0	5	19	21	8	11	45	17	0	—	—
W.	10	7 18	6	31	8	8	7	2	8	7	5	55	21	6	6	31	21	5	0	12	16	9	0	43
Th.	11	8 5	7	33	8	6	8	5	8	7	7	3	21	6	7	35	21	8	1	18	16	7	1	55
F.	12	8 53	8	38	8	8	9	9	8	9	8	6	21	11	8	35	22	2	2	30	16	11	3	4
S.	13	9 41	9	39	8	9	10	5	8	10	9	2	22	6	9	26	22	9	3	35	17	6	4	3
So.	14	10 31	10	29	8	11	10	52	8	11	9	48	23	0	10	9	23	3	4	30	18	1	4	55
M.	15	11 20	11	16	8	11	11	39	9	0	10	31	23	5	10	53	23	7	5	20	18	8	5	44
Tu.	16	0 8	12	0	9	1	—	—	11	12	11	23	8	11	31	23	10	6	4	18	11	6	22	—
W.	17	0 58	0	19	9	1	0	38	9	11	11	50	23	9	—	—	6	40	19	1	6	58	—	—
Th.	18	1 45	0	56	9	2	1	15	9	2	0	8	23	10	0	25	23	10	7	15	19	1	7	32
F.	19	2 30	1	32	9	2	1	49	9	2	0	43	23	10	1	0	23	9	7	49	18	11	8	6
S.	20	3 14	2	6	9	2	2	23	9	1	1	16	23	7	1	33	23	3	8	24	18	8	8	42
So.	21	3 56	2	40	9	1	2	59	9	0	1	51	23	1	2	9	22	9	9	0	18	3	9	18
M.	22	4 39	3	16	9	0	3	35	8	11	2	27	22	6	2	45	22	4	9	36	17	10	9	55
Tu.	23	5 22	3	55	8	11	4	15	8	10	3	5	22	0	3	26	21	8	10	13	17	4	10	34
W.	24	6 7	4	38	8	9	5	2	8	8	3	50	21	4	4	16	21	1	10	56	16	8	11	18
Th.	25	6 54	5	29	8	7	5	56	8	6	4	45	20	9	5	15	20	8	11	42	16	2	—	—
F.	26	7 44	6	27	8	5	6	59	8	5	5	50	20	9	6	27	20	11	0	10	16	2	0	40
S.	27	8 39	7	32	8	6	8	6	8	7	7	3	21	3	7	35	21	9	1	17	16	4	1	55
So.	28	9 39	8	39	8	9	9	12	8	11	8	7	22	4	8	37	23	0	2	31	17	3	3	7
M.	29	10 41	9	44	9	1	10	14	9	3	9	7	23	8	9	34	24	5	3	41	18	7	4	14
Tu.	30	11 45	10	43	9	5	11	12	9	6	10	1	25	1	10	28	25	7	4	46	20	0	5	16
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.									
Phases of the Moon.												Moon's Declination at Noon.												
D. H. M.												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	
Full - - - - 1 11 30 Afternoon.												1	21	18	13	9	4	N. 20	17	20	N. 25	25	1	—
Last Quarter - 8 1 52 Afternoon.												2	21	54	10	9	1	18	18	18	26	1	—	—
New - - - - 16 7 36 Morning.												3	21	1	11	13	11	19	15	27	27	1	—	—
First Quarter 24 10 31 Morning.												4	18	40	12	16	40	20	11	57	28	2	—	—
												5	15	6	13	19	21	21	7	58	29	2	—	—
												6	10	40	14	21	7	22	3	37	30	2	—	—
In Perigee - - 3 7 0 Morning.												7	5	45	15	21	52	23	0	S. 56	—	—	—	—
In Apogee - - 18 2 0 Afternoon.												8	0	39	16	21	38	24	5	33	—	—	—	—

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

JUNE, 1863.

SUNSHINE STATE.	WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's AGE AT NOON.		
	MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.				
	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.			
1	5 49 36	3	6 16 36	11	9 14 15	10	9 38 16	0	10 13 10	9	10 36 10	11	○		
2	6 42 37	6	7 8 37	11	10 1 16	2	10 24 16	4	10 58 11	1	11 22 11	2	15.8		
3	7 33 38	2	7 57 38	3	10 46 16	5	11 8 16	4	11 46 11	2	—	—	16.8		
4	8 20 38	2	8 44 38	0	11 32 16	3	11 59 16	2	0 11 11	1	0 36 11	0	17.8		
5	9 8 37	8	9 31 37	1	—	—	0 27 15	11	1 3 10	11	1 30 10	9	18.8		
6	9 54 36	4	10 16 35	5	0 55 15	8	1 23 15	4	1 56 10	7	2 23 10	5	19.8		
7	10 38 34	6	10 59 33	7	1 51 14	11	2 20 14	7	2 51 10	3	3 19 10	0	20.8		
8	11 24 32	7	11 51 31	10	2 50 14	3	3 22 14	0	3 48 9	10	4 20 9	8	21.8		
9	—	—	0 20 31	2	3 55 13	9	4 28 13	7	4 53 9	6	5 24 9	4	22.8		
0	0 50 30	8	1 22 30	5	5 3 13	6	5 34 13	5	5 54 9	3	6 23 9	2	23.8		
1	1 54 30	5	2 28 30	6	6 4 13	6	6 34 13	7	6 51 9	5	7 21 9	3	24.8		
2	3 33 30	8	3 38 31	0	7 3 13	8	7 31 13	9	7 51 9	6	8 21 9	5	25.8		
3	4 13 31	5	4 43 31	11	7 58 13	11	8 22 14	1	8 51 9	8	9 18 9	7	26.8		
4	5 11 32	6	5 36 32	11	8 43 14	3	9 4 14	4	9 42 9	10	10 4 10	0	27.8		
5	6 1 33	4	6 25 33	7	9 25 14	6	9 46 14	7	10 24 10	2	10 44 10	2	28.8		
6	6 46 33	9	7 6 33	11	10 5 14	8	10 22 14	8	11 2 10	3	11 20 10	3	29.8		
7	7 25 34	1	7 42 34	2	10 39 14	8	10 55 14	8	11 38 10	3	11 55 10	3	30.8		
8	7 59 34	2	8 16 34	2	11 11 14	8	11 27 14	7	—	—	0 13 10	2	31.8		
9	8 32 34	1	8 48 34	0	11 45 14	6	—	—	0 31 10	2	0 49 10	1	32.8		
0	9 4 33	10	9 20 33	8	0 4 14	5	0 23 14	4	1 7 10	0	1 26 9	11	33.8		
1	9 36 33	3	9 53 32	11	0 43 14	2	1 3 14	0	1 44 9	10	2 3 9	8	34.8		
2	10 9 32	6	10 25 32	0	1 24 13	10	1 44 13	9	2 23 9	7	2 44 9	6	35.8		
3	10 42 31	7	11 2 31	0	2 6 13	7	2 29 13	5	3 5 9	5	3 28 9	4	36.8		
4	11 23 30	6	11 49 30	1	2 55 13	3	3 21 13	1	3 53 9	3	4 20 9	2	37.8		
5	—	—	0 16 29	9	3 52 13	0	4 24 12	11	4 51 9	1	5 21 9	0	38.8		
6	0 46 29	8	1 19 29	9	4 59 13	0	5 32 13	2	5 50 9	0	6 20 9	1	39.8		
7	1 53 30	1	2 28 30	8	6 4 13	4	6 34 13	7	6 51 9	3	7 21 9	6	40.8		
8	3 4 31	4	3 42 32	3	7 3 13	11	7 33 14	3	7 52 9	8	8 24 9	10	41.8		
9	4 19 33	2	4 55 34	5	8 3 14	8	8 30 15	1	8 57 10	1	9 28 10	4	42.8		
0	5 27 35	6	5 57 36	6	8 56 15	5	9 22 15	10	9 56 10	7	10 21 10	9	43.8		
{ Mean Spring Range. }				18ft. 7in.				8ft. 0in.				5ft. 6in.			

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
2 32		9	1 11		17	0 28		25	2 12	
2 23		10	0 59		18	0 41		26	2 25	
2 14		11	0 47		19	0 54		27	2 37	
2 4		12	0 35		20	1 7		28	2 50	
1 54		13	0 23		21	1 20		29	3 2	
1 44		14	0 10		22	1 33		30	3 14	
1 33		15	0 3	Sub.	23	1 46				
1 22		16	0 15		24	1 59				

uses of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

# TIDE TABLES FOR THE

## JUNE, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.														
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.											
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.										
			H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.										
M.	1	11 59	9 50	9 5	10 14	9 6	7 3	7 7	7 28	7 8	4 16	10 11	4 40	1															
Tu.	2	morn.	10 37	9 7	11 1	9 7	7 51	7 10	8 14	7 11	5 5	11 5	5 30	1															
W.	3	1 2	11 24	9 7	11 47	9 7	8 37	7 11	8 58	7 10	5 54	11 8	6 17	1															
Th.	4	2 5	—	—	0 12	9 7	9 21	7 9	9 45	7 7	6 41	11 4	7 7	1															
F.	5	3 5	0 39	9 6	1 6	9 5	10 9	7 5	10 35	7 3	7 33	10 10	7 58	1															
S.	6	4 1	1 33	9 4	2 3	9 3	11 1	7 1	11 33	6 10	8 24	10 3	8 52	1															
S.	7	4 53	2 33	9 1	3 3	8 11	—	—	0 9	6 7	9 24	9 8	9 56	1															
M.	8	5 43	3 33	8 9	4 4	8 8	0 46	6 4	1 25	6 2	10 31	9 3	11 4	1															
Tu.	9	6 31	4 34	8 7	5 5	8 6	2 4	6 2	2 40	6 1	11 37	9 0	—	1															
W.	10	7 18	5 35	8 5	6 5	8 4	3 13	6 2	3 42	6 4	0 8	9 0	0 39	1															
Th.	11	8 5	6 35	8 3	7 6	8 3	4 7	6 5	4 32	6 6	1 9	8 11	1 40	1															
F.	12	8 53	7 36	8 4	8 5	8 5	4 56	6 7	5 19	6 7	2 9	9 1	2 37	1															
S.	13	9 41	8 32	8 6	8 56	8 8	5 43	6 8	6 6	6 9	3 3	9 4	3 25	1															
S.	14	10 31	9 18	8 9	9 40	8 10	6 28	6 9	6 51	6 10	3 45	9 9	4 6	1															
M.	15	11 20	10 2	8 11	10 22	9 0	7 14	6 11	7 36	6 11	4 28	10 0	4 49	1															
Tu.	16	0 29	10 41	9 0	10 59	9 0	7 55	6 11	8 12	7 0	5 9	10 3	5 28	1															
W.	17	0 58	11 17	9 0	11 33	8 11	8 29	7 0	8 44	7 0	5 47	10 3	6 3	1															
Th.	18	1 45	11 49	8 11	—	—	9 1	6 11	9 17	6 10	6 19	10 2	6 36	1															
F.	19	2 30	0 6	8 11	0 25	8 11	9 33	6 9	9 49	6 8	6 54	10 0	7 12	1															
S.	20	3 14	0 43	8 11	1 2	8 10	10 5	6 7	10 23	6 6	7 29	9 8	7 47	1															
S.	21	3 56	1 21	8 10	1 42	8 9	10 42	6 5	11 2	6 3	8 5	9 4	8 25	1															
M.	22	4 39	2 4	8 8	2 26	8 8	11 26	6 2	11 52	6 0	8 45	9 1	9 7	1															
Tu.	23	5 22	2 48	8 7	3 11	8 6	—	—	0 20	5 10	9 33	8 10	10 1	1															
W.	24	6 7	3 37	8 5	4 3	8 4	0 52	5 9	1 25	5 9	10 30	8 7	11 2	1															
Th.	25	6 54	4 32	8 3	5 1	8 3	2 2	5 9	2 36	5 9	11 33	8 7	—	1															
F.	26	7 44	5 32	8 3	6 2	8 3	3 9	5 11	3 39	6 1	0 5	8 8	0 37	1															
S.	27	8 39	6 34	8 3	7 7	8 4	4 8	6 4	4 33	6 6	1 9	8 10	1 40	1															
S.	28	9 39	7 37	8 5	8 7	8 7	4 57	6 8	5 21	6 10	2 10	9 3	2 39	1															
M.	29	10 41	8 36	8 10	9 4	9 1	5 47	7 0	6 14	7 3	3 7	9 11	3 33	1															
Tu.	30	11 45	9 31	9 3	9 58	9 5	6 42	7 5	7 10	7 7	3 58	10 8	4 24	1															
Half Mean Spring Range.			4 ft. 9 in.						3 ft. 10 in.						5 ft. 7 in.														
Phases of the Moon.															Moon's Declination at Noon.														
D. H. M.															M. D.	°	'	M. D.	°	'	M. D.	°	'	M. D.	°	'			
Full - - - -															1	21	S. 13	9	4	N. 20	17	20	N. 25	25	10	10			
Last Quarter -															2	21	54	10	9	1	18	18	18	26	14	14			
New - - - -															3	21	1	11	13	11	19	15	27	27	17	17			
First Quarter															4	18	40	12	16	40	20	11	57	28	26	26			
															5	15	6	13	19	21	21	7	58	29	21	21			
															6	10	40	14	21	7	22	3	37	30	21	21			
In Perigee - -															7	5	45	15	21	52	23	08.	56						
In Apogee - -															8	0	39	16	21	38	24	5	33						

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required

BELFAST subtract 3 m.

LONDONDERRY add 4 m.

SLIGO BAY add 9 m.

JUNE, 1863.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age at Noon.	
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.				
Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.			
3 36	14 3	4 1	14 7		3 58	11 5	4 24	11 8		4 19	12 2	4 47	12 4	○		
4 25	14 11	4 48	15 2		4 49	11 10	5 14	12 0		5 11	12 6	5 35	12 7	15.8		
5 13	15 3	5 37	15 3		5 40	12 0	6 5	12 1		6 0	12 8	6 24	12 9	16.8		
6 2	15 2	6 28	15 0		6 29	12 0	6 54	11 11		6 49	12 9	7 15	12 8	17.8		
6 55	14 9	7 21	14 6		7 16	11 9	7 45	11 6		7 40	12 7	8 4	12 5	18.8		
7 48	14 1	8 16	13 8		8 10	11 4	8 34	11 1		8 28	12 3	8 52	12 0	19.8		
8 44	13 2	9 13	12 8		8 59	10 9	9 24	10 6		9 15	11 9	9 39	11 6	20.8		
9 43	12 4	10 13	12 1		9 50	10 3	10 16	10 0		10 6	11 3	10 36	10 11	☾		
10 45	11 10	11 18	11 9		10 44	9 10	11 16	9 9		11 6	10 8	11 35	10 6	22.8		
11 50	11 9	—	—		11 48	9 8	—	—		—	—	0 4	10 4	23.8		
0 20	11 9	0 51	11 10		0 20	9 8	0 52	9 8		0 32	10 5	1 3	10 5	24.8		
1 20	12 0	1 48	12 2		1 27	9 9	2 0	9 10		1 35	10 6	2 9	10 8	25.8		
2 15	12 3	2 40	12 5		2 31	10 0	2 57	10 1		2 43	10 9	3 12	10 11	26.8		
3 4	12 7	3 26	12 9		3 22	10 3	3 46	10 5		3 40	11 0	4 6	11 2	27.8		
3 48	12 11	4 9	13 1		4 10	10 6	4 32	10 8		4 31	11 3	4 55	11 4	28.8		
4 28	13 3	4 46	13 4		4 52	10 9	5 11	10 10		5 15	11 4	5 33	11 5	●		
5 4	13 4	5 22	13 5		5 31	10 10	5 49	10 10		5 51	11 5	6 9	11 6	1.2		
5 40	13 4	5 57	13 4		6 7	10 10	6 24	10 10		6 27	11 6	6 45	11 7	2.2		
6 15	13 3	6 33	13 2		6 41	10 9	6 58	10 8		7 2	11 6	7 19	11 6	3.2		
6 51	13 0	7 9	12 10		7 16	10 7	7 34	10 6		7 36	11 5	7 53	11 5	4.2		
7 28	12 9	7 48	12 6		7 52	10 4	8 9	10 3		8 11	11 4	8 28	11 3	5.2		
8 9	12 4	8 30	12 1		8 26	10 2	8 45	10 0		8 45	11 2	9 2	11 0	6.2		
8 53	11 10	9 17	11 6		9 5	9 10	9 27	9 9		9 20	10 11	9 41	10 9	7.2		
9 42	11 4	10 11	11 3		9 49	9 7	10 13	9 6		10 5	10 7	10 33	10 5	☽		
10 41	11 3	11 14	11 3		10 40	9 5	11 12	9 5		11 2	10 3	11 32	10 2	9.2		
11 48	11 5	—	—		11 45	9 5	—	—		—	—	0 1	10 2	10.2		
0 21	11 7	0 52	11 11		0 19	9 7	0 53	9 9		0 32	10 3	1 3	10 6	11.2		
1 21	12 3	1 50	12 8		1 28	10 0	2 3	10 3		1 36	10 8	2 13	11 0	12.2		
2 20	13 1	2 50	13 6		2 36	10 6	3 8	10 10		2 49	11 4	3 24	11 8	13.2		
3 18	14 0	3 44	14 5		3 37	11 2	4 6	11 6		3 56	11 11	4 27	12 3	14.2		
Mean Spring } Range.					7ft. 5in.					5ft 10in.					6ft. 2in.	

## Equation of Time at Noon.

M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
2 32	Add.	9	1 11	Add.	17	0 28	Sub.	25	2 12	Sub.
2 23		10	0 59		18	0 41		26	2 25	
2 14		11	0 47		19	0 54		27	2 37	
2 4		12	0 35		20	1 7		28	2 50	
1 54		13	0 23		21	1 20		29	3 2	
1 44		14	0 10		22	1 33		30	3 14	
1 33		15	0 3	Sub.	23	1 46				
1 22		16	0 15		24	1 59				

Times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

JULY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																					
W. Th.	1	morn.	3 19	19 4	3 45	19 8	5 13	15 3	5 38	16 1	11 15	12 9	11 40	11 1																											
F. S.	2	0 47	4 12	19 11	4 36	20 1	6 5	15 8	6 32	16 6	—	—	0 7	11 1																											
	3	1 47	4 59	20 2	5 23	20 1	6 57	15 10	7 18	16 7	0 33	13 2	0 58	11 1																											
	4	2 43	5 47	19 10	6 12	19 7	7 42	15 9	8 6	16 4	1 22	13 1	1 48	11 1																											
	5	3 36	6 37	19 2	7 0	18 6	8 29	15 4	8 51	15 8	2 12	12 11	2 37	11 1																											
M. Tu.	6	4 26	7 23	17 11	7 47	17 2	9 12	14 8	9 31	14 10	3 1	12 6	3 24	11 1																											
	7	5 15	8 11	16 6	8 37	15 9	9 53	13 11	10 16	13 10	3 46	11 11	4 9	11 1																											
W. Th.	8	6 3	9 3	15 2	9 30	14 8	10 38	13 1	11 4	12 11	4 34	11 3	4 59	11 1																											
F. S.	9	6 51	10 3	14 4	10 38	14 1	11 30	12 6	—	—	5 24	10 7	5 50	11 1																											
	10	7 39	11 15	13 11	11 53	13 11	0 6	12 4	0 42	12 3	6 29	10 2	7 4	11 1																											
	11	8 28	—	—	0 28	14 0	1 19	12 3	1 55	12 6	7 40	10 2	8 17	11 1																											
	12	9 17	1 1	14 4	1 31	14 8	2 30	12 5	3 1	13 0	8 51	10 5	9 23	11 1																											
M. Tu.	13	10 6	1 57	15 2	2 21	15 7	3 35	12 11	4 2	13 7	9 51	10 11	10 16	11 1																											
W. Th.	14	10 55	2 43	16 0	3 2	16 5	4 27	13 5	4 50	14 3	10 38	11 3	10 57	11 1																											
F. S.	15	11 42	3 20	16 9	3 39	17 0	5 11	13 9	5 31	14 8	11 16	11 6	11 35	11 1																											
	16	oa 28	3 57	17 3	4 15	17 4	5 49	14 1	6 7	14 11	11 52	11 9	—	11 1																											
M. Tu.	17	1 12	4 31	17 6	4 46	17 7	6 24	14 3	6 41	15 1	0 11	11 10	0 28	11 1																											
F. S.	18	1 55	5 2	17 8	5 18	17 8	6 56	14 4	7 10	15 0	0 45	11 10	1 21	11 1																											
	19	2 38	5 33	17 8	5 49	17 7	7 24	14 3	7 40	14 9	1 17	11 11	1 33	11 1																											
M. Tu.	20	3 20	6 6	17 6	6 24	17 4	7 54	14 0	8 12	14 4	1 51	11 11	2 7	11 1																											
W. Th.	21	4 4	6 42	17 0	7 0	16 8	8 28	13 8	8 43	13 11	2 25	11 9	2 43	11 1																											
F. S.	22	4 49	7 21	16 4	7 42	15 10	8 59	13 5	9 16	13 5	3 1	11 7	3 21	11 1																											
	23	5 37	8 4	15 5	8 28	14 11	9 38	13 0	10 0	12 10	3 41	11 3	4 21	11 1																											
M. Tu.	24	6 28	8 54	14 7	9 24	14 4	10 24	12 8	10 53	12 5	4 25	10 10	4 51	11 1																											
F. S.	25	7 23	10 0	14 3	10 38	14 4	11 24	12 5	—	—	5 19	10 5	5 53	11 1																											
	26	8 22	11 19	14 6	12 0	14 11	0 3	12 4	0 44	12 7	6 29	10 3	7 8	11 1																											
M. Tu.	27	9 24	—	—	0 38	15 6	1 26	12 7	2 8	13 3	7 47	10 8	8 27	11 1																											
W. Th.	28	10 27	1 14	16 3	1 46	17 0	2 48	13 4	3 27	14 3	9 5	11 5	9 40	11 1																											
F. S.	29	11 28	2 14	17 11	2 41	18 9	4 2	14 3	4 30	15 4	10 9	12 3	10 37	11 1																											
	30	morn.	3 8	19 6	3 34	20 1	4 59	15 2	5 28	16 2	11 3	12 10	11 30	11 1																											
	31	0 27	3 58	20 5	4 22	20 7	5 54	15 9	6 19	16 9	11 54	13 4	—	11 1																											
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4 in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
			D. H. M.						M.D.			°			'			M.D.			°			'			M.D.			°											
Full	—	—	1	6	46	Morning.			1	19	5.52	9	15	N.50	17	12	N.57	25	19																						
Last Quarter	—	—	7	10	28	Afternoon.			2	16	43	10	18	43	18	9	5	26	21																						
New	—	—	15	10	54	Afternoon.			3	12	29	11	20	43	19	4	51	27	21																						
First Quarter	—	—	23	9	32	Afternoon.			4	7	33	12	21	44	20	0	23	28	20																						
Full	—	—	30	1	33	Afternoon.			5	2	20	13	21	45	21	4	8.11	29	18																						
In Perigee	—	—	1	3	0	Afternoon.			6	2	N.52	14	20	48	22	8	39	30	14																						
In Apogee	—	—	15	6	0	Afternoon.			7	7	45	15	18	56	23	12	50	31	9																						
In Perigee	—	—	30	1	0	Morning.			8	12	7	16	16	17	24	16	32																								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4 m

JULY, 1863.

MONTH DAY.	NORTH SHIELDS.								LEITH.								THURSO.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		
	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	D.		
1	2	52	13	0	3	17	13	4	1	49	16	1	2	14	16	6	8	3	13	6	8	27	13	9	0
2	3	41	13	7	4	6	13	9	2	39	16	9	3	3	16	11	8	51	13	11	9	15	13	11	16.2
3	4	31	13	10	4	56	13	9	3	27	17	0	3	51	16	11	9	40	13	11	10	5	13	9	17.2
4	5	20	13	8	5	46	13	6	4	15	16	9	4	41	16	7	10	31	13	6	10	57	13	3	18.2
5	6	12	13	3	6	38	13	0	5	6	16	4	5	32	16	1	11	23	12	11	11	49	12	6	19.2
6	7	2	12	9	7	26	12	5	5	57	15	9	6	23	15	4	—	—	—	—	0	15	12	120.2	
7	7	52	11	11	8	19	11	6	6	48	14	10	7	14	14	4	0	40	11	8	1	6	11	3	20.2
8	8	49	11	0	9	20	10	8	7	44	13	11	8	14	13	6	1	34	10	10	2	4	10	5	22.2
9	9	52	10	5	10	27	10	3	8	44	13	2	9	20	12	11	2	35	10	1	3	13	9	10	23.2
10	11	0	10	2	11	33	10	2	9	55	12	10	10	27	12	9	3	51	9	8	4	26	9	6	24.2
1	—	—	—	—	0	7	10	3	11	0	12	9	11	32	12	10	5	1	9	6	5	34	9	6	25.2
2	0	39	10	4	1	8	10	5	—	—	—	0	0	3	13	0	6	4	9	9	6	31	10	0	26.2
3	1	35	10	7	1	59	10	10	0	29	13	3	0	53	13	7	6	53	10	4	7	14	10	9	27.2
4	2	22	11	1	2	43	11	4	1	16	13	11	1	38	14	3	7	32	11	1	7	48	11	5	28.2
5	3	0	11	6	3	17	11	9	1	57	14	6	2	15	14	9	8	4	11	9	8	22	11	11	29.2
6	3	35	11	11	3	53	12	1	2	34	14	11	2	51	15	1	8	39	12	0	8	55	12	1	30.5
7	4	10	12	2	4	26	12	3	3	7	15	2	3	22	15	2	9	11	12	2	9	27	12	2	31.5
8	4	42	12	3	4	59	12	3	3	38	15	3	3	54	15	2	9	43	12	2	9	59	12	2	32.5
9	5	15	12	2	5	31	12	2	4	9	15	2	4	26	15	1	10	16	12	1	10	34	12	0	33.5
10	5	49	12	1	6	7	12	0	4	44	15	0	5	1	14	11	10	52	11	10	11	10	11	8	34.5
1	6	25	11	11	6	44	11	9	5	19	14	10	5	39	14	8	11	30	11	6	11	51	11	3	35.5
2	7	3	11	7	7	24	11	5	5	59	14	5	6	21	14	2	—	—	—	—	0	12	11	0	36.5
3	7	47	11	2	8	12	10	10	6	43	13	11	7	7	13	7	0	35	10	9	0	59	10	6	37.5
4	8	40	10	6	9	11	10	4	7	35	13	4	8	5	13	1	1	26	10	3	1	56	10	0	38.5
5	9	46	10	2	10	24	10	3	8	38	12	11	9	17	12	11	2	30	9	11	3	9	9	10	39.5
6	11	1	10	4	11	37	10	6	9	55	13	0	10	31	13	2	3	51	9	10	4	30	9	11	40.5
7	—	—	—	—	0	13	10	10	11	6	13	5	11	40	13	10	5	8	10	1	5	42	10	6	41.5
8	0	47	11	2	1	19	11	7	—	—	—	0	0	13	14	4	6	15	11	1	6	43	11	8	42.5
9	1	48	12	0	2	15	12	6	0	42	14	10	1	10	15	6	7	6	12	4	7	29	13	0	43.5
10	2	41	13	0	3	5	13	5	1	37	16	1	2	3	16	7	7	53	13	7	8	17	14	0	44.5
1	3	30	13	10	3	54	14	1	2	29	17	0	2	51	17	3	8	39	14	3	9	2	14	4	45.5
at Mean Spring Range. } 6ft. 8in.								8ft. 2in.								6ft. 7in.									

Mean Spring } 6ft. 8in.  
Range.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
3 25	Sub.	9	4 49	Sub.	17	5 48	Sub.	25	6 13	Sub.
3 37		10	4 58		18	5 53		26	6 14	
3 48		11	5 6		19	5 57		27	6 14	
3 59		12	5 14		20	6 1		28	6 13	
4 10		13	5 22		21	6 5		29	6 12	
4 20		14	5 29		22	6 8		30	6 10	
4 30		15	5 36		23	6 10		31	6 7	
4 39		16	5 42		24	6 12				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.



JULY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																					
W.	1	morn.	11 40	9 8	—	—	10 54	26 1	11 20	26 7	5 45	21 1	6 12	2																											
Th.	2	0 47	0 8	9 10	0 35	10 0	11 46	26 11	—	—	6 38	21 10	7 22																												
F.	3	1 47	1 0	10 1	1 26	10 1	0 11	27 2	0 36	27 3	7 26	22 1	7 50																												
S.	4	2 43	1 50	10 1	2 14	10 1	1 0	27 2	1 24	26 10	8 14	21 9	8 39																												
♄.	5	3 36	2 38	10 0	3 2	9 11	1 48	26 5	2 12	25 11	9 4	21 0	9 27																												
M.	6	4 26	3 25	9 9	3 47	9 7	2 36	25 3	2 58	24 7	9 49	19 11	10 9																												
Tu.	7	5 15	4 9	9 5	4 33	9 3	3 21	23 11	3 44	23 2	10 31	18 8	10 53																												
W.	8	6 3	4 58	9 1	5 24	8 10	4 10	22 5	4 39	21 8	11 15	17 2	11 38																												
Th.	9	6 51	5 50	8 8	6 22	8 5	5 8	21 1	5 44	20 8	—	—	0 5																												
F.	10	7 39	6 55	8 3	7 29	8 3	6 22	20 5	6 59	20 5	0 36	15 10	1 12																												
S.	11	8 28	8 5	8 3	8 40	8 4	7 34	20 6	8 9	20 8	1 53	15 8	2 32																												
♄.	12	9 17	9 13	8 5	9 44	8 6	8 40	21 0	9 8	21 5	3 7	16 2	3 40																												
M.	13	10 6	10 12	8 7	10 36	8 8	9 33	21 11	9 56	22 4	4 10	17 0	4 36																												
Tu.	14	10 55	10 59	8 9	11 20	8 10	10 17	22 8	10 36	23 0	5 1	17 11	5 24																												
W.	15	11 42	11 41	8 11	—	—	10 55	23 3	11 13	23 6	5 45	18 6	6 5																												
Th.	16	ca28	0 1	9 0	0 20	9 1	11 32	23 10	11 50	24 0	6 24	19 0	6 41																												
F.	17	1 12	0 38	9 2	0 55	9 3	—	—	0 7	24 2	6 58	19 5	7 13																												
S.	18	1 55	1 12	9 3	1 29	9 4	0 23	24 4	0 39	24 5	7 29	19 7	7 44																												
♄.	19	2 38	1 44	9 4	1 59	9 5	0 55	24 6	1 11	24 6	8 0	19 7	8 17																												
M.	20	3 20	2 16	9 5	2 33	9 4	1 27	24 4	1 43	24 1	8 34	19 4	8 52																												
Tu.	21	4 4	2 50	9 4	3 7	9 3	2 0	23 10	2 18	23 6	9 10	18 11	9 27																												
W.	22	4 49	3 25	9 2	3 44	9 1	2 36	23 2	2 55	22 10	9 45	18 3	10 4																												
Th.	23	5 37	4 4	9 0	4 26	8 11	3 15	22 5	3 37	21 11	10 24	17 6	10 45																												
F.	24	6 28	4 50	8 9	5 15	8 8	4 2	21 5	4 30	21 0	11 7	16 8	11 32																												
S.	25	7 23	5 44	8 6	6 19	8 5	5 2	20 8	5 41	20 8	—	—	0 3																												
♄.	26	8 22	6 55	8 4	7 33	8 5	6 22	20 9	7 3	21 1	0 36	16 1	1 17																												
M.	27	9 24	8 12	8 7	8 50	8 9	7 41	21 7	8 18	22 4	2 1	16 8	2 42																												
Tu.	28	10 27	9 27	9 0	10 1	9 2	8 52	23 2	9 22	24 0	3 22	18 1	3 59																												
W.	29	11 28	10 30	9 5	10 59	9 7	9 49	24 11	10 15	25 8	4 31	19 9	5 2																												
Th.	30	morn.	11 28	9 9	11 57	9 11	10 42	26 4	11 9	26 11	5 32	21 3	6 1																												
F.	31	0 27	—	—	0 22	10 1	11 34	27 3	11 58	27 8	6 25	22 3	6 49																												
Half Mean Spring Range.			4 ft. 10 in.						13 ft. 0 in.						10 ft. 6 in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
D. H. M.																					M.D. ° ' M.D. ° ' M.D. ° ' M.D. ° '																				
Full - - - - 1 6 46 Morning.																					1 19 S. 52 9 15 N. 50 17 12 N. 57 25 10																				
Last Quarter - 7 10 28 Afternoon.																					2 16 43 10 18 43 18 9 5 26 2																				
New - - - - 15 10 54 Afternoon.																					3 12 29 11 20 43 19 4 51 27 2																				
First Quarter - 23 9 32 Afternoon.																					4 7 33 12 21 44 20 0 23 28 2																				
Full - - - - 30 1 33 Afternoon.																					5 2 20 13 21 45 21 4 S. 11 29 1																				
In Perigee - - 1 3 0 Afternoon.																					6 2 N. 52 14 20 48 22 8 39 30 1																				
In Apogee - - 15 6 0 Afternoon.																					7 7 45 15 18 56 23 12 50 31																				
In Perigee - - 30 1 0 Morning.																					8 12 7 16 16 17 24 16 32																				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required GREENOCK add 19 m. LIVERPOOL add 12 m. PEMBROKE add :

JULY, 1863.

MONTH DAY.	NORTH SHIELDS.								LEITH.								THURSO.								C's AGE AT NOON. D.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		
	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	
1	2	52	13	0	3	17	13	4	1	49	16	1	2	14	16	6	8	3	13	6	8	27	13	9	0
2	3	41	13	7	4	6	13	9	2	39	16	9	3	3	16	11	8	51	13	11	9	15	13	11	16.2
3	4	31	13	10	4	56	13	9	3	27	17	0	3	51	16	11	9	40	13	11	10	5	13	9	17.2
4	5	20	13	8	5	46	13	6	4	15	16	9	4	41	16	7	10	31	13	6	10	57	13	3	18.2
5	6	12	13	3	6	38	13	0	5	6	16	4	5	32	16	1	11	23	12	11	11	49	12	6	19.2
6	7	2	12	9	7	26	12	5	5	57	15	9	6	23	15	4	—	—	—	—	0	15	12	12	20.2
7	7	52	11	11	8	19	11	6	6	48	14	10	7	14	14	4	0	40	11	8	1	6	11	3	21.2
8	8	49	11	0	9	20	10	8	7	44	13	11	8	14	13	6	1	34	10	10	2	4	10	5	22.2
9	9	52	10	5	10	27	10	3	8	44	13	2	9	20	12	11	2	35	10	1	3	13	9	10	23.2
10	11	0	10	2	11	33	10	2	9	55	12	10	10	27	12	9	3	51	9	8	4	26	9	6	24.2
1	—	—	—	—	0	7	10	3	11	0	12	9	11	32	12	10	5	1	9	6	5	34	9	6	25.2
2	0	39	10	4	1	8	10	5	—	—	—	0	0	3	13	0	6	4	9	9	6	31	10	0	26.2
3	1	35	10	7	1	59	10	10	0	29	13	3	0	53	13	7	6	53	10	4	7	14	10	9	27.2
4	2	22	11	1	2	43	11	4	1	16	13	11	1	38	14	3	7	32	11	1	7	48	11	5	28.2
5	3	0	11	6	3	17	11	9	1	57	14	6	2	15	14	9	8	4	11	9	8	22	11	11	29.2
6	3	35	11	11	3	53	12	1	2	34	14	11	2	51	15	1	8	39	12	0	8	55	12	1	30.5
7	4	10	12	2	4	26	12	3	3	7	15	2	3	22	15	2	9	11	12	2	9	27	12	2	31.5
8	4	42	12	3	4	59	12	3	3	38	15	3	3	54	15	2	9	43	12	2	9	59	12	2	32.5
9	5	15	12	2	5	31	12	2	4	9	15	2	4	26	15	1	10	16	12	1	10	34	12	0	33.5
10	5	49	12	1	6	7	12	0	4	44	15	0	5	1	14	11	10	52	11	10	11	10	11	8	34.5
1	6	25	11	11	6	44	11	9	5	19	14	10	5	39	14	8	11	30	11	6	11	51	11	3	35.5
2	7	3	11	7	7	24	11	5	5	59	14	5	6	21	14	2	—	—	—	—	0	12	11	0	36.5
3	7	47	11	2	8	12	10	10	6	43	13	11	7	7	13	7	0	35	10	9	0	59	10	6	37.5
4	8	40	10	6	9	11	10	4	7	35	13	4	8	5	13	1	1	26	10	3	1	56	10	0	38.5
5	9	46	10	2	10	24	10	3	8	38	12	11	9	17	12	11	2	30	9	11	3	9	9	10	39.5
6	11	1	10	4	11	37	10	6	9	55	13	0	10	31	13	2	3	51	9	10	4	30	9	11	40.5
7	—	—	—	—	0	13	10	10	11	6	13	5	11	40	13	10	5	8	10	1	5	42	10	6	41.5
8	0	47	11	2	1	19	11	7	—	—	—	0	0	13	14	4	6	15	11	1	6	43	11	8	42.5
9	1	48	12	0	2	15	12	6	0	42	14	10	1	10	15	6	7	6	12	4	7	29	13	0	43.5
10	2	41	13	0	3	5	13	5	1	37	16	1	2	3	16	7	7	53	13	7	8	17	14	0	44.5
1	3	30	13	10	3	54	14	1	2	29	17	0	2	51	17	3	8	39	14	3	9	2	14	4	45.5
If Mean Spring Range. } 6ft. 8in.								8ft. 2in.								6ft. 7in.									

If Mean Spring } 6ft. 8in.  
Range.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
3 25		9	4 49		17	5 48		25	6 13	
3 37		10	4 58		18	5 53		26	6 14	
3 48		11	5 6		19	5 57		27	6 14	
3 59		12	5 14		20	6 1		28	6 13	
4 10		13	5 22		21	6 5		29	6 12	
4 20		14	5 29		22	6 8		30	6 10	
4 30		15	5 36		23	6 10		31	6 7	
4 39		16	5 42		24	6 12				

mes of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6m.      LEITH add 13m.      THURSO add 14m.

JULY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.							
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.					
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.				
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.				
W.	1	morn.	11 40	9 8	—	—	10 54	26 1	11 20	26 7	5 45	21 1	6 12	2				
Th.	2	0 47	0 8	9 10	0 35	10 0	11 46	26 11	—	—	6 38	21 10	7 22	2				
F.	3	1 47	1 0	10 1	1 26	10 1	0 11	27 2	0 36	27 3	7 26	22 1	7 50	1				
S.	4	2 43	1 50	10 1	2 14	10 1	1 0	27 2	1 24	26 10	8 14	21 9	8 39	2				
So.	5	3 36	2 38	10 0	3 2	9 11	1 48	26 5	2 12	25 11	9 42	21 0	9 27	2				
M.	6	4 26	3 25	9 9	3 47	9 7	2 36	25 3	2 58	24 7	9 49	19 11	10 9	1				
Tu.	7	5 15	4 9	9 5	4 33	9 3	3 21	23 11	3 44	23 2	10 31	18 8	10 53	1				
W.	8	6 3	4 58	9 1	5 24	8 10	4 10	22 5	4 39	21 8	11 15	17 2	11 38	1				
Th.	9	6 51	5 50	8 8	6 22	8 5	5 8	21 1	5 44	20 8	—	—	0 5	1				
F.	10	7 39	6 55	8 3	7 29	8 3	6 22	20 5	6 59	20 5	0 36	15 10	1 12	1				
S.	11	8 28	8 5	8 3	8 40	8 4	7 34	20 6	8 9	20 8	1 53	15 8	2 32	1				
So.	12	9 17	9 13	8 5	9 44	8 6	8 40	21 0	9 8	21 5	3 7	16 2	3 40	1				
M.	13	10 6	10 12	8 7	10 36	8 8	9 33	21 11	9 56	22 4	4 10	17 0	4 36	1				
Tu.	14	10 55	10 59	8 9	11 20	8 10	10 17	22 8	10 36	23 0	5 17	11 5	5 24	1				
W.	15	11 42	11 41	8 11	—	—	10 55	23 3	11 13	23 6	5 45	18 6	6 5	1				
Th.	16	ca 28	0 1	9 0	0 20	9 1	11 32	23 10	11 50	24 0	6 24	19 0	6 41	1				
F.	17	1 12	0 38	9 2	0 55	9 3	—	—	0 7	24 2	6 58	19 5	7 13	1				
S.	18	1 55	1 12	9 3	1 29	9 4	0 23	24 4	0 39	24 5	7 29	19 7	7 44	1				
So.	19	2 38	1 44	9 4	1 59	9 5	0 55	24 6	1 11	24 6	8 0	19 7	8 17	1				
M.	20	3 20	2 16	9 5	2 33	9 4	1 27	24 4	1 43	24 1	8 34	19 4	8 52	1				
Tu.	21	4 4	2 50	9 4	3 7	9 3	2 0	23 10	2 18	23 6	9 10	18 11	9 27	1				
W.	22	4 49	3 25	9 2	3 44	9 1	2 36	23 2	2 55	22 10	9 45	18 3	10 4	1				
Th.	23	5 37	4 4	9 0	4 26	8 11	3 15	22 5	3 37	21 11	10 24	17 6	10 45	1				
F.	24	6 28	4 50	8 9	5 15	8 8	4 2	21 5	4 30	21 0	11 7	16 8	11 32	1				
S.	25	7 23	5 44	8 6	6 19	8 5	5 2	20 8	5 41	20 8	—	—	0 3	1				
So.	26	8 22	6 55	8 4	7 33	8 5	6 22	20 9	7 3	21 1	0 36	16 1	1 17	1				
M.	27	9 24	8 12	8 7	8 50	8 9	7 41	21 7	8 18	22 4	2 1	16 8	2 42	1				
Tu.	28	10 27	9 27	9 0	10 1	9 2	8 52	23 2	9 22	24 0	3 22	18 1	3 59	1				
W.	29	11 28	10 30	9 5	10 59	9 7	9 49	24 11	10 15	25 8	4 31	19 9	5 2	1				
Th.	30	morn.	11 28	9 9	11 57	9 11	10 42	26 4	11 9	26 11	5 32	21 3	6 1	1				
F.	31	0 27	—	—	0 22	10 1	11 34	27 3	11 58	27 8	6 25	22 3	6 49	1				
Half Mean Spring Range.			4 ft. 10 in.				13 ft. 0 in.				10 ft. 6 in.							
Phases of the Moon.							Moon's Declination at Noon.											
D. H. M.							M.D. ° ' "											
Full	—	—	1	6	46	Morning.	M.D.	°	'	"	M.D.	°	'	"	M.D.	°	'	"
Last Quarter	—	—	7	10	28	Afternoon.	1	19	S. 52	9	15	N. 50	17	12	N. 57	25	1	
New	—	—	15	10	54	Afternoon.	2	16	43	10	18	43	18	9	5	26	2	
First Quarter	—	—	23	9	32	Afternoon.	3	12	29	11	20	43	19	4	51	27	2	
Full	—	—	30	1	33	Afternoon.	4	7	33	12	21	44	20	0	23	28	2	
							5	2	20	13	21	45	21	4	S. 11	29	1	
In Perigee	—	—	1	3	0	Afternoon.	6	2	N. 52	14	20	48	22	8	39	30	1	
In Apogee	—	—	15	6	0	Afternoon.	7	7	45	15	18	56	23	12	50	31	1	
In Perigee	—	—	30	1	0	Morning.	8	12	7	16	16	17	24	16	32			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add

JULY, 1863.

WESTON-SUPER-MARE.												HOLYHEAD.												KINGSTOWN.												C's Age at Noon.																																																																																																																																																																
MORNING.						AFTERNOON.						MORNING.						AFTERNOON.						MORNING.						AFTERNOON.																																																																																																																																																																						
Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	D.																																																																																																																																																																								
1 6 27 37 3	6 55 37 11	9 47 16 2	10 12 16 5	10 45 11 0	11 9 11 2	2 7 22 38 7	7 40 39 0	10 36 16 7	10 58 16 8	11 34 11 3	11 59 11 3	3 8 10 39 1	8 33 39 0	11 21 16 8	11 45 16 7	—	—	0 24 11 3	1 15 11 1	18'2	5 9 42 37 9	10 23 36 10	0 38 16 3	1 5 15 11	1 41 10 11	2 7 10 9	19'2	6 10 21 35 11	10 40 34 9	1 31 15 6	1 56 15 2	2 32 10 6	2 56 10 4	20'2	7 10 59 33 8	11 20 32 6	2 21 14 9	2 47 14 4	3 20 10 1	3 46 9 10	22'2	8 11 44 31 5	—	—	3 15 13 11	3 45 13 6	4 14 9 7	4 44 9 4	23'2	9 0 10 30 5	0 41 29 7	4 16 13 2	4 53 13 0	5 14 9 2	5 45 9 0	24'2	0 1 14 29 2	1 50 28 11	5 28 12 10	6 11 12 10	6 17 9 0	6 48 9 0	25'2	1 2 27 28 10	3 42 9 0	6 34 12 10	7 6 12 11	7 21 9 1	7 53 9 8	26'2	2 3 41 29 5	4 17 29 11	7 36 13 1	8 41 13 3	8 26 9 3	8 56 9 4	27'2	3 4 49 30 8	5 17 31 5	8 29 13 6	8 52 13 9	9 25 9 6	9 50 9 7	28'2	4 5 43 32 1	6 53 32 8	9 12 14 0	9 30 14 2	10 12 9 9	10 29 9 11	0 5 26 33 2	6 47 33 6	9 48 14 5	10 7 14 7	10 46 10 0	11 3 10 2	0 5 7 6 33 11	7 25 34 4	10 24 14 8	10 40 14 10	11 21 10 3	11 38 10 4	0 5 7 7 41 34 8	7 57 34 10	10 54 14 11	11 8 14 11	11 54 10 4	—	—	1 5 8 8 12 35 0	8 27 35 1	11 24 15 0	11 40 15 0	0 11 10 4	0 27 10 4	2 5 9 8 42 35 3	8 58 35 2	11 56 15 0	—	—	0 43 10 4	0 59 10 4	3 5 9 9 14 35 0	9 30 34 9	0 14 14 11	0 33 14 10	1 19 10 3	1 36 10 2	4 5 10 9 46 34 4	10 23 32 10	0 53 14 8	1 13 14 6	1 54 10 1	2 13 9 11	5 5 2 10 18 33 3	10 34 32 7	1 33 14 3	1 54 14 1	2 33 9 10	2 54 9 9	6 5 3 10 52 31 11	11 13 31 2	2 16 13 10	2 40 13 7	3 15 9 7	3 39 9 5	7 5 4 11 36 30 6	—	—	3 7 13 3	3 37 13 1	4 5 9 4	4 35 9 2	8 5 5 0 42 29 11	0 38 29 7	4 11 13 0	4 50 12 11	5 8 9 0	5 42 9 0	9 5 6 1 14 29 7	1 54 29 10	5 28 13 0	6 5 13 3	6 17 9 1	6 52 9 3	10 5 7 2 34 30 5	3 16 31 4	6 40 13 6	7 14 13 11	7 27 9 5	8 3 9 8	11 5 8 3 58 32 6	4 37 33 9	7 48 14 4	8 18 14 10	8 39 9 11	9 14 10 2	12 5 9 5 12 35 2	5 43 36 5	8 44 15 4	9 10 15 10	9 43 10 6	10 10 10 9	13 5 10 6 13 37 7	6 43 38 5	9 36 16 3	10 11 16 8	10 34 11 1	10 59 11 4	15 5 11 7 8 39 2	7 32 39 9	10 24 16 11	10 46 17 1	11 22 11 6	11 45 11 6	15 5
Mean Spring Tide.						18 ft. 7 in.						8 ft. 0 in.						5 ft. 6 in.																																																																																																																																																																																		

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
3 25	Sub.	9	4 49	Sub.	17	5 48	Sub.	25	6 13	Sub.	25	6 13	Sub.
3 37		10	4 58		18	5 53		26	6 14		26	6 14	
3 48		11	5 6		19	5 57		27	6 14		27	6 14	
3 59		12	5 14		20	6 1		28	6 13		28	6 13	
4 10		13	5 22		21	6 5		29	6 12		29	6 12	
4 20		14	5 29		22	6 8		30	6 10		30	6 10	
4 30		15	5 36		23	6 10		31	6 7		31	6 7	
4 39		16	5 42		24	6 12							

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

JULY, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
			H. M.	H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.																							
W.	1	morn.	10 23	9 6	10 48	9 7	7 37	7 9	8 2	7 11	4 50	11 3	5 17	11 6																											
Th.	2	0 47	11 13	9 8	11 36	9 8	8 26	8 1	8 49	8 1	5 42	11 8	6 6	11 9																											
F.	3	1 47	11 59	9 8	—	—	9 11	8 0	9 33	7 11	6 29	11 8	6 54	11 6																											
S.	4	2 43	0 24	9 8	0 51	9 8	9 57	7 9	10 21	7 7	7 19	11 4	7 44	11 1																											
♄.	5	3 36	1 18	9 7	1 45	9 5	10 46	7 5	11 9	7 2	8 9	10 9	8 32	10 5																											
M.	6	4 26	2 11	9 4	2 37	9 2	11 37	6 11	—	—	8 57	10 1	9 23	9 9																											
Tu.	7	5 15	3 3	8 11	3 29	8 9	0 7	6 8	0 41	6 4	9 52	9 6	10 23	9 2																											
W.	8	6 3	3 57	8 8	4 26	8 6	1 16	6 2	1 53	6 0	10 55	8 11	11 26	8 9																											
Th.	9	6 51	4 55	8 4	5 26	8 3	2 29	5 10	3 4	5 10	11 59	8 7	—	—																											
F.	10	7 39	5 58	8 2	6 31	8 1	3 36	5 11	4 5	6 0	0 32	8 6	1 5	8 6																											
S.	11	8 28	7 6	8 0	7 40	8 1	4 34	6 1	5 1	6 2	1 39	8 6	2 12	8 7																											
♄.	12	9 17	8 11	8 2	8 38	8 3	5 26	6 3	5 50	6 4	2 43	8 9	3 9	8 11																											
M.	13	10 6	9 3	8 5	9 26	8 7	6 13	6 5	6 36	6 6	3 33	9 2	3 54	9 4																											
Tu.	14	10 55	9 47	8 9	10 6	8 10	6 58	6 8	7 18	6 9	4 14	9 7	4 33	9 10																											
W.	15	11 42	10 24	8 11	10 42	8 11	7 38	6 10	7 57	6 11	4 51	10 0	5 10	10 2																											
Th.	16	0 28	11 0	9 0	11 17	9 0	8 14	7 0	8 30	7 1	5 29	10 3	5 47	10 4																											
F.	17	1 12	11 32	9 0	11 47	9 0	8 45	7 1	8 59	7 1	6 2	10 5	6 16	10 5																											
S.	18	1 55	—	—	0 2	9 1	9 14	7 1	9 28	7 0	6 32	10 5	6 49	10 5																											
♄.	19	2 38	0 19	9 1	0 36	9 1	9 43	7 0	9 59	6 11	7 5	10 4	7 22	10 2																											
M.	20	3 20	0 54	9 1	1 12	9 0	10 15	6 10	10 33	6 9	7 39	10 0	7 56	9 10																											
Tu.	21	4 4	1 31	9 0	1 52	8 11	10 51	6 8	11 11	6 6	8 14	9 8	8 34	9 6																											
W.	22	4 49	2 13	8 10	2 35	8 9	11 36	6 4	—	—	8 55	9 4	9 18	9 1																											
Th.	23	5 37	2 59	8 7	3 22	8 6	0 3	6 2	0 33	5 11	9 45	8 11	10 14	8 9																											
F.	24	6 28	3 49	8 5	4 17	8 4	1 6	5 10	1 42	5 9	10 46	8 8	11 20	8 7																											
S.	25	7 23	4 49	8 3	5 23	8 2	2 23	5 9	3 1	5 10	11 56	8 7	—	—																											
♄.	26	8 22	5 58	8 2	6 35	8 2	3 36	6 0	4 9	6 3	0 32	8 8	1 9	8 9																											
M.	27	9 24	7 13	8 3	7 48	8 5	4 39	6 6	5 6	6 8	1 46	9 0	2 21	9 3																											
Tu.	28	10 27	8 22	8 8	8 52	8 11	5 34	6 11	6 2	7 2	2 53	9 8	3 22	10 1																											
W.	29	11 28	9 19	9 2	9 46	9 5	6 30	7 5	6 58	7 7	3 47	10 6	4 12	10 11																											
Th.	30	morn.	10 12	9 7	10 38	9 9	7 25	7 10	7 52	8 1	4 38	11 4	5 5	11 8																											
F.	31	0 27	11 1	9 10	11 23	9 10	8 14	8 3	8 36	8 4	5 30	11 11	5 53	12 0																											
Half Mean Spring Range.			4 ft. 9 in.						3 ft. 10 in.						5 ft. 7 in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
			D.	H.	M.				M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'																					
Full - - - -			1	6	46	Morning.			1	19	8.52	9	15	N.50	17	12	N.57	25	19	S.26																					
Last Quarter -			7	10	28	Afternoon.			2	16	43	10	18	43	18	9	5	26	21	16																					
New - - - -			15	10	54	Afternoon.			3	12	29	11	20	43	19	4	51	27	21	47																					
First Quarter			23	9	32	Afternoon.			4	7	33	12	21	44	20	0	23	28	20	47																					
Full - - - -			30	1	33	Afternoon.			5	2	20	13	21	45	21	4	S.11	29	18	18																					
									6	2	N.52	14	20	48	22	8	39	30	14	32																					
In Perigee - -			1	3	0	Afternoon.			7	7	45	15	18	56	23	12	50	31	9	49																					
In Apogee - -			15	6	0	Afternoon.			8	12	7	16	16	17	24	16	32																								
In Perigee - -			30	1	0	Morning.																																			

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required, — for  
**BELFAST subtract 2 m. | LONDONDERRY add 4 m. | SLIGO BAY add 9 m.**

JULY, 1863.

GALWAY.				QUEENSTOWN.				WATERFORD.				C's AGE AT NOON.				
ING.	AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
	Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.			Time.	Height.	
Height.	H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		D.
10	4 35	15 2	4 33	11 9	5 0	12 0	4 56	12 6	5 23	12 8	0					○
5	5 26	15 7	5 27	12 2	5 53	12 3	5 48	12 10	6 13	12 11	16.2					
7	6 15	15 6	6 17	12 4	6 41	12 3	6 38	13 0	7 2	13 0	17.2					
4	7 6	15 1	7 6	12 2	7 31	11 11	7 27	12 11	7 51	12 10	18.2					
9	7 56	14 4	7 56	11 9	8 18	11 6	8 14	12 8	8 36	12 5	19.2					
11	8 46	13 4	8 39	11 2	9 0	10 10	8 57	12 2	9 17	11 10	20.2					
9	9 37	12 3	9 23	10 6	9 46	10 2	9 37	11 6	10 1	11 2	21.2					☾
10	10 34	11 5	10 9	9 11	10 34	9 8	10 28	10 10	10 56	10 6	22.2					
3	11 43	11 1	11 7	9 5	11 40	9 3	11 27	10 3	11 58	10 0	23.2					
—	0 17	11 0	—	—	0 15	9 2	—	—	0 28	9 11	24.2					
1	1 24	11 2	0 51	9 2	1 28	9 3	1 2	9 10	1 37	9 11	25.2					
5	2 21	11 7	2 3	9 4	2 36	9 6	2 12	10 1	2 47	10 4	26.2					
10	3 12	12 2	3 4	9 9	3 30	9 11	3 19	10 6	3 46	10 8	27.2					
5	3 53	12 8	3 53	10 2	4 14	10 4	4 12	10 11	4 34	11 1	28.2					
10	4 30	13 1	4 34	10 6	4 53	10 8	4 56	11 2	5 17	11 4	29.2					●
3	4 5	13 6	5 12	10 9	5 31	10 11	5 35	11 5	5 51	11 6	30.5					○
3	8 5	37 13	9 5	48 10	6 4	11 0	6 8	11 7	6 24	11 8	31.5					
3	9 6	10 13	9 6	21 11	6 36	11 1	6 41	11 9	6 57	11 10	32.5					
3	9 6	43 13	8 6	51 11	7 8	11 0	7 13	11 10	7 30	11 10	33.5					
3	6 7	19 13	5 7	26 10	7 43	10 10	7 46	11 10	8 3	11 9	34.5					
13	3 7	58 13	0 8	110 8	8 18	10 7	8 20	11 8	8 36	11 6	35.5					
12	8 8	40 12	4 8	36 10	8 54	10 2	8 53	11 4	9 11	11 2	36.5					
12	0 9	28 11	8 9	16 10	9 38	9 9	9 30	11 0	9 52	10 9	37.5					☾
11	5 10	28 11	3 10	1 9	10 28	9 5	10 19	10 7	10 51	10 4	38.5					
11	2 11	43 11	3 11	4 9	11 40	9 4	11 24	10 2	11 58	10 1	39.5					
—	0 21	11 6	—	—	0 19	9 6	—	—	0 33	10 2	40.5					
11	10 1	32 12	3 0	59 9	1 39	9 11	1 9	10 5	1 47	10 8	41.5					
12	9 2	36 13	4 2	18 10	2 53	10 8	2 29	11 1	3 7	11 6	42.5					
13	10 3	32 14	5 3	23 11	3 53	11 6	3 41	11 10	4 12	12 3	43.5					
9	14 11	4 25	15 4	21 11	4 49	12 2	4 43	12 7	5 12	12 10	44.5					○
9	15 9	5 12	16 0	5 14	5 39	12 6	5 36	13 0	5 59	13 2	45.5					
In Spring } 7ft. 5in.				5ft. 10in.				6ft. 2in.								

## Equation of Time at Noon.

S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
25	Sub.	9	4 49	Sub.	17	5 48	Sub.	25	6 13	Sub.
37		10	4 58		18	5 53		26	6 14	
48		11	5 6		19	5 57		27	6 14	
59		12	5 14		20	6 1		28	6 13	
10		13	5 22		21	6 5		29	6 12	
20		14	5 29		22	6 8		30	6 10	
30		15	5 36		23	6 10		31	6 7	
39		16	5 42		24	6 12				

High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## AUGUST, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
			H. M.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	
S.	1	1 m 22	0 43	12 2		1 7	12 2		7 26	22 3		7 49	22 3		4 16	15 5		4 38	15 5	
S.	2	2 15	1 30	12 2		1 52	12 1		8 11	22 3		8 33	22 1		5 1	15 4		5 23	15 4	
M.	3	3 6	2 15	11 11		2 37	11 9		8 55	21 9		9 16	21 4		5 45	14 11		6 7	14 11	
Tu.	4	3 56	2 58	11 7		3 20	11 5		9 38	20 9		9 59	20 2		6 30	14 2		6 52	13 1	
W.	5	4 45	3 41	11 2		4 1	10 10		10 19	19 6		10 42	18 9		7 15	13 3		7 38	12 1	
Th.	6	5 35	4 22	10 7		4 43	10 4		11 7	18 1		11 36	17 6		8 1	12 3		8 27	11 1	
F.	7	6 24	5 8	10 1		5 35	9 10		—	—		0 9	16 10		8 56	11 4		9 27	11 0	
S.	8	7 14	6 3	9 7		6 39	9 6		0 41	16 3		1 15	15 10		10 3	10 8		10 40	10 1	
S.	9	8 3	7 20	9 5		8 1	9 6		1 48	15 8		2 25	15 9		11 19	10 6		11 55	10 1	
M.	10	8 52	8 40	9 7		9 18	9 9		3 1	16 0		3 39	16 5		—	—		0 31	10 1	
Tu.	11	9 39	9 51	9 11		10 19	10 2		4 13	16 11		4 39	17 4		1 3	11 3		1 29	11 1	
W.	12	10 26	10 44	10 4		11 6	10 6		5 2	17 9		5 23	18 3		1 54	11 11		2 18	12 1	
Th.	13	11 11	11 27	10 9		11 46	10 11		5 43	18 7		6 2	18 11		2 39	12 6		2 58	12 1	
F.	14	11 54	—	—		0 4	11 0		6 20	19 3		6 38	19 6		3 16	13 1		3 31	13 1	
S.	15	0 a 37	0 21	11 1		0 36	11 2		6 54	19 9		7 10	20 0		3 46	13 7		4 1	13 1	
S.	16	1 20	0 51	11 3		1 6	11 3		7 25	20 2		7 41	20 4		4 16	13 11		4 31	14 1	
M.	17	2 3	1 22	11 4		1 38	11 3		7 57	20 5		8 13	20 5		4 46	14 1		5 3	14 1	
Tu.	18	2 48	1 54	11 3		2 10	11 3		8 28	20 4		8 44	20 3		5 18	13 11		5 34	13 1	
W.	19	3 34	2 26	11 2		2 43	11 1		9 0	20 1		9 19	19 9		5 51	13 8		6 10	13 1	
Th.	20	4 24	3 1	10 11		3 20	10 10		9 38	19 5		9 57	19 0		6 30	13 2		6 50	12 1	
F.	21	5 16	3 39	10 8		3 58	10 6		10 16	18 7		10 40	18 1		7 12	12 7		7 36	12 1	
S.	22	6 12	4 19	10 3		4 43	10 1		11 8	17 8		11 41	17 2		8 2	11 11		8 31	11 1	
S.	23	7 10	5 12	9 11		5 42	9 10		—	—		0 17	16 10		9 4	11 4		9 43	11 1	
M.	24	8 10	6 18	9 9		7 3	9 10		0 56	16 7		1 35	16 6		10 25	11 2		11 7	11 1	
Tu.	25	9 11	7 49	9 11		8 31	10 2		2 14	16 9		2 52	17 4		11 45	11 7		—	—	
W.	26	10 9	9 11	10 5		9 47	10 9		3 31	18 1		4 7	18 10		0 23	12 1		0 57	12 1	
Th.	27	11 6	10 21	11 1		10 48	11 5		4 40	19 8		5 5	20 4		1 30	13 3		2 0	13 1	
F.	28	12 0	11 13	11 9		11 38	12 0		5 29	20 11		5 54	21 6		2 25	14 2		2 50	14 1	
S.	29	morn.	—	—		0 2	12 2		6 19	21 10		6 42	22 3		3 12	15 0		3 34	15 1	
S.	30	0 53	0 24	12 3		0 46	12 3		7 5	22 5		7 27	22 6		3 56	15 6		4 17	15 1	
M.	31	1 44	1 8	12 3		1 30	12 2		7 49	22 5		8 9	22 3		4 38	15 6		4 58	15 1	
Half Mean Spring Range.			5 ft 9 in.						10 ft. 5 in.						7 ft. 2 in.					
Phases of the Moon.										Moon's Declination at Noon.										
D. H. M.										M.D. ° ' "										
Last Quarter - 6 10 5 Morning.										1 4 S. 36 9 21 N. 42 17 2 S. 58 25 10 S. 1										
New - - - - 14 2 3 Afternoon.										2 0 N. 46 10 21 1 18 7 26 26 16 1										
First Quarter - 22 6 20 Morning.										3 5 56 11 19 25 19 11 40 27 11 5										
Full - - - - 28 8 55 Afternoon.										4 10 37 12 16 59 20 15 26 28 6 8										
In Apogee - - 11 11 0 Afternoon.										5 14 38 13 13 51 21 18 30 29 1 3										
In Perigee - - 27 9 0 Morning.										6 17 50 14 10 8 22 20 37 30 3 N. 4										
										7 20 6 15 5 59 23 21 33 31 8 3										
										8 21 24 16 1 34 24 21 8										

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, —  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.



## AUGUST, 1863.

MONTH DAY.	DOVER.						SHEERNESS.						LONDON.						C's AGE AT NOON.
	MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
	Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
	H. M. P. I.			H. M. P. I.			H. M. P. I.			H. M. P. I.			H. M. P. I.			H. M. P. I.			
1	—	—		0 19 20	0		1 30 16	11		1 54 17	0		3 2 19	11		3 25 20	2	16.5	
2	0 42 20	0		1 5 19	10		2 16 17	0		2 38 16	11		3 46 20	3		4 7 20	3	17.5	
3	1 29 19	8		1 51 19	4		2 59 16	10		3 20 16	8		4 29 20	1		4 50 19	11	18.5	
4	2 14 19	0		2 35 18	5		3 41 16	4		4 3 16	0		5 12 19	7		5 34 19	3	19.5	
5	2 56 17	10		3 17 17	2		4 23 15	7		4 44 15	1		5 53 18	10		6 14 18	5	20.5	
6	3 38 16	6		4 0 15	11		5 6 14	8		5 29 14	2		6 36 17	10		7 1 17	4	21	
7	4 24 15	2		4 49 14	7		5 55 13	9		6 24 13	4		7 26 16	10		7 52 16	5	22.5	
8	5 19 14	1		5 51 13	10		6 56 12	11		7 32 12	9		8 23 15	11		9 1 15	8	23.5	
9	6 28 13	9		7 7 13	11		8 12 12	8		8 53 12	9		9 40 15	5		10 20 15	4	24.5	
10	7 48 14	3		8 23 14	8		9 32 12	11		10 11 13	2		11 0 15	5		11 36 15	7	25.5	
11	8 51 15	1		9 16 15	6		10 44 13	5		11 10 13	9		—	—		0 11 15	10	26.5	
12	9 40 15	11		10 2 16	4		11 33 14	1		11 55 14	4		0 38 16	1		1 2 16	5	27.5	
13	10 22 16	8		10 41 17	1		—	—		0 15 14	7		1 24 16	10		1 43 17	2	28.5	
14	10 59 17	4		11 17 17	8		0 33 14	10		0 51 15	1		2 2 17	6		2 20 17	9	29	
15	11 34 17	10		11 51 18	0		1 8 15	3		1 23 15	6		2 36 18	1		2 53 18	4	30.9	
16	—	—		0 8 18	2		1 38 15	7		1 54 15	8		3 8 18	6		3 22 18	8	31.9	
17	0 25 18	3		0 43 18	4		2 8 15	9		2 23 15	9		3 38 18	10		3 52 18	11	32.9	
18	1 0 18	4		1 18 18	3		2 39 15	9		2 54 15	9		4 9 18	11		4 23 18	11	33.9	
19	1 36 18	2		1 54 18	0		3 9 15	8		3 25 15	6		4 41 18	10		4 56 18	8	34.9	
20	2 13 17	9		2 33 17	5		3 43 15	4		4 2 15	2		5 14 18	6		5 33 18	4	35.9	
21	2 53 17	0		3 14 16	6		4 21 14	10		4 41 14	6		5 51 18	1		6 12 17	9	36.9	
22	3 37 16	1		4 3 15	7		5 4 14	2		5 30 13	11		6 34 17	4		6 59 17	0	37	
23	4 30 15	2		5 2 14	9		5 59 13	7		6 32 13	4		7 25 16	8		7 58 16	5	38.9	
24	5 38 14	8		6 16 14	9		7 12 13	2		7 56 13	3		8 40 16	2		9 25 16	1	39.9	
25	6 58 15	2		7 41 15	10		8 41 13	5		9 23 13	10		10 7 16	2		10 51 16	5	40.9	
26	8 19 16	6		8 52 17	2		10 3 14	3		10 38 14	9		11 31 16	9		—	—	41.9	
27	9 22 17	10		9 48 18	6		11 11 15	3		11 37 15	8		0 8 17	3		0 39 17	9	42.9	
28	10 14 19	1		10 40 19	6		—	—		0 1 16	1		0 18 18	4		1 33 18	10	43	
29	11 5 19	11		11 30 20	1		0 25 16	6		0 48 16	10		1 56 19	3		2 19 19	8	44.9	
30	11 53 20	2		—	—		1 11 17	1		1 34 17	2		2 42 20	0		3 3 20	3	45.9	
31	0 16 20	2		0 39 20	0		1 55 17	2		2 15 17	1		3 25 20	5		3 46 20	4	46.9	
Mean Spring } 9ft. 4in. Range.						8ft. 0in.						9ft. 7in.							

## Equation of Time at Noon.

M.	S.	Sub.	M. D.	M.	S.	Sub.	M. D.	M.	S.	Sub.	M. D.	M.	S.	Sub.
6	4		9	5	18		17	3	56		25	2	1	
6	0		10	5	10		18	3	44		26	1	45	
5	56		11	5	1		19	3	31		27	1	28	
5	51		12	4	52		20	3	17		28	1	11	
5	46		13	4	42		21	3	3		29	0	53	
5	40		14	4	31		22	2	48		30	0	35	
5	33		15	4	20		23	2	33		31	0	17	
5	26		16	4	8		24	2	17					

es of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.



## AUGUST, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.														
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.											
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.										
S.	1	11m22	0 46	10 2	1 10	10 3	—	—	0 21	27 10	7 11	22 8	7 33	22 7															
S.	2	2 15	1 33	10 3	1 55	10 2	0 44	27 10	1 6	27 7	7 55	22 4	8 17	22 0															
M.	3	3 6	2 17	10 2	2 37	10 0	1 27	27 2	1 47	26 7	8 38	21 7	9 0	21 0															
Tu.	4	3 56	2 59	9 10	3 18	9 8	2 8	25 11	2 29	25 1	9 21	20 4	9 39	19 7															
W.	5	4 45	3 37	9 6	3 59	9 3	2 49	24 3	3 10	23 5	9 59	18 9	10 19	18 0															
Th.	6	5 35	4 21	9 0	4 44	8 10	3 32	22 6	3 55	21 7	10 40	17 3	11 2	16 4															
F.	7	6 24	5 10	8 7	5 37	8 4	4 24	20 9	4 55	19 11	11 25	15 7	11 55	15 1															
S.	8	7 14	6 11	8 2	6 47	8 0	5 32	19 6	6 13	19 3	—	—	0 28	14 9															
S.	9	8 3	7 26	7 11	8 6	8 0	6 57	19 4	7 36	19 6	1 10	14 8	1 54	14 9															
M.	10	8 52	8 46	8 1	9 20	8 3	8 14	19 11	8 47	20 6	2 37	15 2	3 14	15 0															
Tu.	11	9 39	9 49	8 5	10 14	8 6	9 13	21 1	9 35	21 8	3 45	16 3	4 12	16 10															
W.	12	10 26	10 37	8 8	10 59	8 9	9 57	22 3	10 16	22 10	4 37	17 5	5 1	18 0															
Th.	13	11 11	11 19	8 11	11 39	9 0	10 34	23 3	10 52	23 9	5 23	18 6	5 43	18 11															
F.	14	11 54	11 57	9 2	—	—	11 9	24 1	11 26	24 6	6 1	19 4	6 18	19 8															
S.	15	12 37	0 14	9 3	0 30	9 5	11 42	24 11	11 57	25 1	6 33	20 0	6 48	20 3															
S.	16	1 20	0 45	9 6	1 1	9 6	—	—	0 12	25 4	7 3	20 5	7 19	20 6															
M.	17	2 3	1 18	9 7	1 35	9 7	0 28	25 5	0 45	25 5	7 35	20 5	7 50	20 5															
Tu.	18	2 48	1 50	9 7	2 6	9 7	1 12	25 5	1 16	25 3	8 6	20 4	8 23	20 1															
W.	19	3 34	2 21	9 7	2 40	9 6	1 32	24 11	1 49	24 7	8 41	19 10	9 0	19 6															
Th.	20	4 24	2 58	9 5	3 16	9 3	2 7	24 2	2 26	23 8	9 18	19 1	9 36	18 6															
F.	21	5 16	3 34	9 2	3 56	9 0	2 45	23 1	3 7	22 6	9 56	18 0	10 18	17 6															
S.	22	6 12	4 20	8 10	4 47	8 9	3 31	21 11	3 59	21 3	10 42	16 11	11 7	16 4															
S.	23	7 10	5 17	8 7	5 52	8 5	4 32	20 9	5 12	20 4	11 38	15 11	—	—															
M.	24	8 10	6 32	8 4	7 14	8 4	5 56	20 4	6 44	20 8	0 15	15 10	0 57	15 11															
Tu.	25	9 11	7 57	8 6	8 38	8 8	7 26	21 3	8 7	22 1	1 45	16 4	2 30	17 0															
W.	26	10 9	9 16	8 11	9 50	9 2	8 41	23 0	9 13	24 1	3 10	17 11	3 48	18 11															
Th.	27	11 6	10 19	9 5	10 45	9 7	9 39	25 0	10 3	25 10	4 19	19 10	4 48	20 8															
F.	28	12 0	11 11	9 10	11 37	10 0	10 26	26 7	10 50	27 1	5 15	21 5	5 41	22 0															
S.	29	morn.	—	—	0 1	10 2	11 13	27 8	11 37	27 11	6 5	22 5	6 28	22 9															
S.	30	0 53	0 24	10 3	0 47	10 4	11 59	28 1	—	—	6 50	22 10	7 11	22 10															
M.	31	1 44	1 10	10 4	1 31	10 3	0 20	28 0	0 41	27 10	7 31	22 7	7 51	22 2															
Half Mean Spring } Range.			4ft. 10in.				13ft. 0in.				10ft. 6in.																		
Phases of the Moon.															Moon's Declination at Noon.														
			D	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'											
Last Quarter -			6	10	5	Morning.	1	48	36	9	21	N. 42	17	28	S. 58	25	19	S. 11											
New - - - - -			14	2	3	Afternoon.	2	0	N. 46	10	21	1	18	7	26	26	16	1											
First Quarter -			22	6	20	Morning.	3	5	56	11	19	25	19	11	40	27	11	5											
Full - - - - -			28	8	55	Afternoon.	4	10	37	12	16	59	20	15	26	28	6	5											
							5	14	38	13	13	51	21	18	30	29	1	3											
In Apogee - -			11	11	0	Afternoon.	6	17	50	14	10	8	22	20	37	30	3	N. 4											
In Perigee - -			27	9	0	Morning.	7	20	6	15	5	59	23	21	33	31	8	3											
								21	24	16	1	34	24	21	8														

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, — for  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

NORTH SHIELDS.												LEITH.												THURSO.												C's Age at Noon.
MORNING.						AFTERNOON.						MORNING.						AFTERNOON.						MORNING.						AFTERNOON.						
Time.	Height.	H. M.	F. L.	Time.	Height.	H. M.	F. L.	Time.	Height.	H. M.	F. L.	Time.	Height.	H. M.	F. L.	Time.	Height.	H. M.	F. L.	Time.	Height.	H. M.	F. L.	Time.	Height.	H. M.	F. L.	D.								
1	4 18	14	3	4 41	14	2	3 13	17	5	3 36	17	4	9 25	14	4	9 48	14	3	16	5																
2	5 4	14	1	5 27	13	11	3 58	17	3	4 21	17	0	10 11	14	0	10 34	13	9	17	5																
3	5 49	13	8	6 11	13	5	4 44	16	9	5 5	16	6	10 56	13	4	11 19	12	11	18	5																
4	6 34	13	1	6 55	12	8	5 28	16	1	5 50	15	8	11 42	12	5	—	—	—	19	5																
5	7 16	12	2	7 40	11	8	6 12	15	1	6 36	14	6	0 4	11	11	0 28	11	4	20	5																
6	8 5	11	2	8 33	10	7	7 0	13	11	7 28	13	5	0 52	10	10	1 19	10	4	22	5																
7	9 5	10	2	9 37	9	9	7 59	12	11	8 31	12	6	1 50	9	10	2 22	9	5	23	5																
8	10 15	9	7	10 52	9	6	9 8	12	2	9 47	12	1	3 1	9	2	3 43	9	0	23	5																
9	11 31	9	7	—	—		10 25	12	1	11 2	12	2	4 24	8	10	5 2	8	11	24	5																
0	0 8	9	8	0 45	9	11	11 38	12	5	—	—		5 40	9	1	6 11	9	5	25	5																
1	1 15	10	2	1 40	10	5	0 10	12	8	0 34	13	1	6 36	9	9	6 56	10	3	26	5																
2	2 1	10	8	2 23	11	0	0 55	13	5	1 17	13	11	7 15	10	9	7 32	11	2	27	5																
3	2 42	11	5	3 0	11	9	1 38	14	3	1 56	14	8	7 48	11	7	8 3	11	11	28	5																
4	3 16	12	0	3 32	12	3	2 13	15	0	2 30	15	3	8 18	12	3	8 33	12	7	28	5																
5	3 47	12	6	4 2	12	8	2 46	15	6	3 0	15	8	8 48	12	8	9 1	12	9	0	9																
6	4 17	12	9	4 32	12	10	3 13	15	9	3 27	15	10	9 16	12	10	9 33	12	10	1	9																
7	4 48	12	10	5 6	12	9	3 43	15	10	4 0	15	9	9 50	12	9	10 6	12	8	2	9																
8	5 22	12	8	5 38	12	7	4 16	15	8	4 33	15	7	10 23	12	7	10 40	12	4	3	9																
9	5 55	12	5	6 14	12	3	4 50	15	5	5 8	15	3	10 59	12	2	11 19	11	10	4	9																
0	6 33	12	1	6 53	11	10	5 28	15	0	5 48	14	9	11 40	11	6	—	—																			

M.	S.		M.D.	M.	S.		M.D.	M.	S.		M.D.	M.	S.		M.D.	M.	S.											
6	4	Sub.	9	5	18	Sub.	17	3	56	Sub.	25	2	1	Sub.	6	0		10	5	10		18	3	44		26	1	45
5	56		11	5	1		19	3	31		27	1	28		5	51		12	4	52		20	3	17		28	1	11
5	46		13	4	42		21	3	3		29	0	53		5	40		14	4	31		22	2	48		30	0	35
5	33		15	4	20		23	2	33		31	0	17		5	26		16	4	8		24	2	17				

times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
NORTH SHIELDS add 6 m.                      LEITH add 13 m.                      THURSO add 14 m.

## AUGUST, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.																								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.																							
S.	1	1m 22	0 46	10 2	1 10	10 3	—	—	0 21	27 10	7 11	22 8	7 33	22 7	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	2	2 15	1 33	10 3	1 55	10 2	0 44	27 10	1 6	27 7	7 55	22 4	8 17	22 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
M.	3	3 6	2 17	10 2	2 37	10 0	1 27	27 2	1 47	26 7	8 38	21 7	9 0	21 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
Tu.	4	3 56	2 59	9 10	3 18	9 8	2 8	25 11	2 29	25 1	9 21	20 4	9 39	19 7	—	—	—	—	—	—	—	—	—	—	—	—	—																
W.	5	4 45	3 37	9 6	3 59	9 3	2 49	24 3	3 10	23 5	9 59	18 9	10 19	18 6	—	—	—	—	—	—	—	—	—	—	—	—	—																
Th.	6	5 35	4 21	9 0	4 44	8 10	3 32	22 6	3 55	21 7	10 40	17 3	11 2	16 4	—	—	—	—	—	—	—	—	—	—	—	—	—																
F.	7	6 24	5 10	8 7	5 37	8 4	4 24	20 9	4 55	19 11	11 25	15 7	11 55	15 7	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	8	7 14	6 11	8 2	6 47	8 0	5 32	19 6	6 13	19 3	—	—	0 28	14 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	9	8 3	7 26	7 11	8 6	8 0	6 57	19 4	7 36	19 6	1 10	14 8	1 54	14 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
M.	10	8 52	8 46	8 1	9 20	8 3	8 14	19 11	8 47	20 6	2 37	15 2	3 14	15 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
Tu.	11	9 39	9 49	8 5	10 14	8 6	9 13	21 1	9 35	21 8	3 45	16 3	4 12	16 12	—	—	—	—	—	—	—	—	—	—	—	—	—																
W.	12	10 26	10 37	8 8	10 59	8 9	9 57	22 3	10 16	22 10	4 37	17 5	5 1	18 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
Th.	13	11 11	11 19	8 11	11 39	9 0	10 34	23 3	10 52	23 9	5 23	18 6	5 43	18 11	—	—	—	—	—	—	—	—	—	—	—	—	—																
F.	14	11 54	11 57	9 2	—	—	11 9	24 1	11 26	24 6	6 1	19 4	6 18	19 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	15	0a 37	0 14	9 3	0 30	9 5	11 42	24 11	11 57	25 1	6 33	20 0	6 48	20 3	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	16	1 20	0 45	9 6	1 1	9 6	—	—	0 12	25 4	7 3	20 5	7 19	20 4	—	—	—	—	—	—	—	—	—	—	—	—	—																
M.	17	2 3	1 18	9 7	1 35	9 7	0 28	25 5	0 45	25 5	7 35	20 5	7 50	20 5	—	—	—	—	—	—	—	—	—	—	—	—	—																
Tu.	18	2 48	1 50	9 7	2 6	9 7	1 1	25 5	1 16	25 3	8 6	20 4	8 23	20 5	—	—	—	—	—	—	—	—	—	—	—	—	—																
W.	19	3 34	2 21	9 7	2 40	9 6	1 32	24 11	1 49	24 7	8 41	19 10	9 0	19 6	—	—	—	—	—	—	—	—	—	—	—	—	—																
Th.	20	4 24	2 58	9 5	3 16	9 3	2 7	24 2	2 26	23 8	9 18	19 1	9 36	18 6	—	—	—	—	—	—	—	—	—	—	—	—	—																
F.	21	5 16	3 34	9 2	3 56	9 0	2 45	23 1	3 7	22 6	9 56	18 0	10 18	17 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	22	6 12	4 20	8 10	4 47	8 9	3 31	21 11	3 59	21 3	10 42	16 11	11 7	16 4	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	23	7 10	5 17	8 7	5 52	8 5	4 32	20 9	5 12	20 4	11 38	15 11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—																
M.	24	8 10	6 32	8 4	7 14	8 4	5 56	20 4	6 44	20 8	0 15	15 10	0 57	15 11	—	—	—	—	—	—	—	—	—	—	—	—	—																
Tu.	25	9 11	7 57	8 6	8 38	8 8	7 26	21 3	8 7	22 1	1 45	16 4	2 30	17 6	—	—	—	—	—	—	—	—	—	—	—	—	—																
W.	26	10 9	9 16	8 11	9 50	9 2	8 41	23 0	9 13	24 1	3 10	17 11	3 48	18 11	—	—	—	—	—	—	—	—	—	—	—	—	—																
Th.	27	11 6	10 19	9 5	10 45	9 7	9 39	25 0	10 3	25 10	4 19	19 10	4 48	20 8	—	—	—	—	—	—	—	—	—	—	—	—	—																
F.	28	12 0	11 11	9 10	11 37	10 0	10 26	26 7	10 50	27 1	5 15	21 5	5 41	22 0	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	29	morn.	—	—	0 1	10 2	11 13	27 8	11 37	27 11	6 5	22 5	6 28	22 9	—	—	—	—	—	—	—	—	—	—	—	—	—																
S.	30	0 53	0 24	10 3	0 47	10 4	11 59	28 1	—	—	6 50	22 10	7 11	22 10	—	—	—	—	—	—	—	—	—	—	—	—	—																
M.	31	1 44	1 10	10 4	1 31	10 3	0 20	28 0	0 41	27 10	7 31	22 7	7 51	22 2	—	—	—	—	—	—	—	—	—	—	—	—	—																
Half Mean Spring Range.			4 ft. 10 in.				13 ft. 0 in.				10 ft. 6 in.																																
Phases of the Moon.												Moon's Declination at Noon.																															
D H. M.												M.D. ° ' "												M.D. ° ' "																			
Last Quarter - 6 10 5 Morning.												1 48.36 9 21N.42 17 28.58 25 19S.19																															
New - - - - 14 2 3 Afternoon.												2 0N.46 10 21 1 18 7 26 26 16 10																															
First Quarter - 22 6 20 Morning.												3 5 56 11 19 25 19 11 40 27 11 57																															
Full - - - - 28 8 55 Afternoon.												4 10 37 12 16 59 20 15 26 28 6 59																															
												5 14 38 13 13 51 21 18 30 29 1 39																															
In Apogee - - 11 11 0 Afternoon.												6 17 50 14 10 8 22 20 37 30 3N.40																															
In Perigee - - 27 9 0 Morning.												7 20 6 15 5 59 23 21 33 31 8 38																															
												21 24 16 1 34 24 21 8																															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

## AUGUST, 1863.

ESTON-SUPER-MARE.										HOLYHEAD.										KINGSTOWN.										C's Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.									
M.	F.	I.			H.	M.	F.	I.		H.	M.	F.	I.		H.	M.	F.	I.		H.	M.	F.	I.		D.					
55	39	11			8	17	39	11		11	7	17	1		11	29	17	0		—	—	0	9	11	6	16.5				
38	39	8			8	59	39	3		11	52	16	10		—	—	0	32	11	5	0	55	11	4	17.5					
18	38	7			9	38	37	9		0	15	16	8		0	37	16	4	1	18	11	2	1	40	11	0	18.5			
56	36	7			10	13	35	4		1	1	15	11		1	24	15	5	2	3	10	9	2	25	10	6	19.5			
30	34	0			10	47	32	8		1	46	14	11		2	9	14	5	2	46	10	2	3	9	9	11	20.5			
7	31	5			11	30	30	0		2	33	13	11		3	0	13	5	3	33	9	8	3	58	9	4	(			
57	28	10			—	—	—	—		3	31	12	11		4	3	12	6	4	29	9	1	5	1	8	10	22.5			
31	27	11			1	6	27	6		4	41	12	3		5	20	12	2	5	35	8	8	6	9	8	7	23.5			
48	27	4			2	29	27	5		5	59	12	2		6	36	12	3	6	45	8	8	7	22	8	9	24.5			
9	27	11			3	48	28	7		7	12	12	6		7	43	12	9	7	59	8	11	8	33	9	1	25.5			
22	29	6			4	51	30	4		8	9	13	1		8	31	13	5	9	1	9	3	9	27	9	5	26.5			
18	31	4			5	42	32	3		8	53	13	9		9	11	14	1	9	51	9	8	10	11	9	10	27.5			
4	33	1			6	24	33	9		9	29	14	5		9	46	14	8	10	29	10	0	10	44	10	2	28.5			
43	34	5			7	0	34	11		10	3	14	11		10	18	15	2	11	0	10	4	11	15	10	6	●			
16	35	6			7	32	36	0		10	32	15	4		10	45	15	6	11	30	10	8	11	44	10	8	0.9			
47	36	3			8	2	36	5		10	59	15	7		11	14	15	7	12	0	10	8	—	—	—	—	1.9			
18	36	6			8	33	36	6		11	30	15	7		11	47	15	6	0	17	10	8	0	34	10	8	2.9			
48	36	5			9	3	36	2		—	—	—	—		0	4	15	5	0	50	10	8	1	7	10	7	3.9			
20	35	9			9	37	35	3		0	21	15	4		0	41	15	1	1	24	10	5	1	43	10	4	4.9			
53	34	6			10	9	33	8		1	1	14	10		1	22	14	7	2	2	10	2	2	22	10	0	5.9			
26	32	9			10	46	31	10		1	43	14	3		2	8	13	11	2	43	9	10	3	7	9	7	6.9			
9	30	10			11	37	30	0		2	34	13	6		3	4	13	2	3	33	9	5	4	3	9	3	)			
—	—	—			0	12	29	4		3	39	12	11		4	21	12	9	4	37	9	1	5	16	8	11	8.9			
51	29	1			1	35	29	4		5	4	12	10		5	47	13	0	5	55	8	11	6	34	9	1	9.9			
19	30	0			3	3	31	0		6	26	13	4		7	4	13	9	7	13	9	4	7	51	9	7	10.9			
45	32	3			4	26	33	9		7	37	14	3		8	9	14	10	8	28	9	11	9	3	10	3	11.9			
0	35	3			5	29	36	8		8	35	15	5		8	58	15	11	9	33	10	6	9	57	10	10	12.9			
56	37	10			6	22	38	9		9	21	16	5		9	44	16	9	10	19	11	1	10	41	11	4	○			
47	39	6			7	11	39	11		10	6	17	0		10	27	17	2	11	3	11	7	11	24	11	8	14.9			
33	40	4			7	54	40	2		10	47	17	3		11	6	17	3	11	46	11	8	—	—	—	—	15.9			
14	39	11			8	34	39	4		11	26	17	0		11	47	16	9	0	8	11	7	0	30	11	5	16.9			
at Spring Tide.					18 ft. 7 in.					8 ft. 0 in.					5 ft. 6 in.															

## Equation of Time at Noon.

L. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
4	Sub.	9	5 18	Sub.	17	3 56	Sub.	25	2 1	Sub.
0		10	5 10		18	3 44		26	1 45	
56		11	5 1		19	3 31		27	1 28	
51		12	4 52		20	3 17		28	1 11	
46		13	4 42		21	3 3		29	0 53	
40		14	4 31		22	2 48		30	0 35	
33		15	4 20		23	2 33		31	0 17	
26		16	4 8		24	2 17				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## SEPTEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
			H. M.	H. M.	F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.				
Tu.	1	2m35	5 43	19 9	6	6 2	19 3	7 43	15 9	8	8 0	15 8	1 24	13 3	2	1 44	13 0						
W.	2	3 26	6 20	18 6	6	6 39	17 9	8 18	15 2	8	8 36	14 9	2 2	12 9	2	2 21	12 5						
Th.	3	4 17	6 59	16 9	9	7 20	15 11	8 52	14 3	9	9 9	13 9	2 40	12 0	3	3 0	11 8						
F.	4	5 7	7 42	15 0	0	8 8	14 1	9 28	13 4	9	9 47	12 8	3 20	11 3	3	3 40	10 10						
S.	5	5 57	8 35	13 4	4	9 8	12 10	10 9	12 5	10	10 35	11 7	4 5	10 5	4	4 31	10 0						
S.	6	6 47	9 48	12 6	6	10 31	12 5	11 2	11 8	11	11 42	11 0	5 3	9 8	5	5 41	9 3						
M.	7	7 35	11 16	12 6	6	11 57	12 10	—	—	0	0 25	11 7	6 21	9 4	7	7 5	9 3						
Tu.	8	8 22	—	—	—	0 35	13 3	1 7	11 3	1	1 47	12 3	7 44	9 7	8	8 24	9 1						
W.	9	9 7	1 8	13 11	1	1 33	14 6	2 25	11 10	2	2 58	13 1	8 59	10 3	9	9 25	10 7						
Th.	10	9 51	1 54	15 3	3	2 13	16 0	3 29	12 9	3	3 54	13 10	9 48	10 11	10	10 8	11 1						
F.	11	10 35	2 32	16 8	8	2 48	17 3	4 16	13 6	4	4 37	14 6	10 27	11 7	10	10 43	11 15						
S.	12	11 18	3 4	17 10	10	3 20	18 1	4 56	14 2	5	5 14	15 11	11 0	12 1	11	11 16	12 1						
S.	13	0 2	3 36	18 7	7	3 52	18 10	5 31	14 9	5	5 48	15 5	11 32	12 5	11	11 48	12 1						
M.	14	0 46	4 8	19 0	0	4 25	19 1	6 5	15 2	6	6 22	15 7	—	—	0	0 4	12 1						
Tu.	15	1 33	4 41	19 2	2	4 57	19 1	6 40	15 4	6	6 55	15 5	0 22	12 8	0	0 39	12 1						
W.	16	2 21	5 14	18 11	11	5 31	18 9	7 9	15 2	7	7 25	15 1	0 57	12 7	1	1 13	12 1						
Th.	17	3 13	5 49	18 5	5	6 6	18 1	7 43	14 11	8	8 0	14 8	1 32	12 5	1	1 49	12 1						
F.	18	4 7	6 26	17 7	7	6 46	16 11	8 18	14 6	8	8 37	14 1	2 7	12 2	2	2 28	12 1						
S.	19	5 4	7 10	16 3	3	7 37	15 6	8 56	14 0	9	9 20	13 5	2 47	11 8	3	3 10	11 1						
S.	20	6 2	8 6	14 10	10	8 39	14 4	9 45	13 5	10	10 10	12 8	3 35	11 1	4	4 3	10 1						
M.	21	7 0	9 18	14 1	10	10 3	14 1	10 46	12 11	11	11 24	12 2	4 35	10 6	5	5 12	10 1						
Tu.	22	7 57	10 51	14 3	11	11 36	14 9	—	—	0	0 9	12 10	5 55	10 2	6	6 40	10 1						
W.	23	8 53	—	—	0	0 17	15 4	0 57	12 5	1	1 43	13 7	7 23	10 7	8	8 5	10 1						
Th.	24	9 47	0 51	16 3	1	1 22	17 1	2 25	13 4	2	2 0	14 6	8 42	11 5	9	9 14	11 1						
F.	25	10 39	1 49	17 11	11	2 12	18 9	3 31	14 3	3	3 0	15 5	9 43	12 3	10	10 7	12 1						
S.	26	11 31	2 33	19 6	6	2 55	20 1	4 26	15 1	4	4 52	16 1	10 29	12 11	10	10 51	13 1						
S.	27	morn.	3 16	20 5	5	3 36	20 6	5 14	15 10	5	5 36	16 5	11 13	13 3	11	11 33	13 1						
M.	28	0 22	3 58	20 6	6	4 19	20 5	5 58	16 1	6	6 19	16 5	11 54	13 4	—	—	—						
Tu.	29	1 14	4 38	20 2	2	4 57	19 10	6 38	16 1	6	6 55	15 11	0 16	13 3	0	0 37	13 1						
W.	30	2 5	5 16	19 4	4	5 34	18 9	7 12	15 8	7	7 30	15 4	0 57	13 0	1	1 16	13 1						
Half Mean Spring } Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.								
Phases of the Moon.												Moon's Declination at Noon.											
												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	
Last Quarter-												1	13	N. 1	9	14	N. 40	17	17	8.40	25	3 8.4	
New - - - -												2	16	35	10	11	9	18	19	59	26	1 N. 3	
First Quarter-												3	19	14	11	7	8	19	21	12	27	6 3	
Full - - - -												4	20	52	12	2	47	20	21	9	28	11 1	
												5	21	28	13	1	8.44	21	19	46	29	15	
In Apogee - -												6	21	5	14	6	15	22	17	8	30	18	
In Perigee - -												7	19	45	15	10	33	23	13	25			
												8	17	35	16	14	27	24	8	52			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 4 m.

## AUGUST, 1863.

MONTH DAY.	GALWAY.								QUEENSTOWN.								WATERFORD.								C's Age at Noon.		
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.						
	Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.				D.	
1	5 35	16	1		5 58	16	0		6 2	12	7		6 25	12	7		6 23	13	3		6 46	13	3		16.5		
2	6 21	15	9		6 43	15	7		6 47	12	5		7 9	12	3		7 9	13	2		7 30	13	1		17.5		
3	7 5	15	2		7 27	14	9		7 30	12	0		7 51	11	9		7 50	12	11		8 11	12	8		18.5		
4	7 49	14	3		8 11	13	8		8 11	11	5		8 30	11	0		8 30	12	5		8 48	12	0		19.5		
5	8 34	13	0		8 57	12	4		8 49	10	7		9 10	10	3		9 7	11	7		9 25	11	3		20.5		
6	9 22	11	9		9 50	11	2		9 32	9	10		9 55	9	5		9 46	10	10		10 13	10	5		21.5		
7	10 21	10	8		10 57	10	5		10 22	9	1		10 56	8	10		10 44	10	0		11 17	9	8		22.5		
8	11 35	10	4		—	—			11 32	8	9		—	—			11 50	9	6		—	—			23.5		
9	0 15	10	4		0 53	10	5		0 12	8	8		0 52	8	9		0 26	9	5		1 3	9	6		24.5		
10	1 30	10	8		2 1	11	0		1 33	8	11		2 10	9	1		1 42	9	8		2 19	9	11		25.5		
11	2 26	11	5		2 50	11	9		2 41	9	4		3 6	9	7		2 52	10	3		3 20	10	5		26.5		
12	3 13	12	1		3 33	12	6		3 31	9	11		3 53	10	2		3 47	10	8		4 11	10	11		27.5		
13	3 51	12	10		4 9	13	2		4 13	10	5		4 32	10	8		4 33	11	2		4 54	11	5		28.5		
14	4 26	13	6		4 41	13	10		4 49	10	11		5 6	11	1		5 12	11	7		5 29	11	9		29.5		
15	4 56	14	1		5 11	14	3		5 22	11	3		5 38	11	4		5 44	11	11		5 58	12	0		30.9		
16	5 27	14	4		5 43	14	5		5 54	11	5		6 10	11	6		6 14	12	1		6 31	12	2		31.9		
17	6 0	14	5		6 16	14	4		6 26	11	6		6 42	11	6		6 48	12	2		7 4	12	3		32.9		
18	6 32	14	3		6 49	14	1		6 58	11	5		7 14	11	4		7 19	12	2		7 35	12	2		33.9		
19	7 8	13	11		7 27	13	7		7 32	11	2		7 51	11	0		7 53	12	1		8 10	11	11		34.9		
20	7 47	13	3		8 8	12	11		8 8	10	9		8 27	10	6		8 27	11	9		8 45	11	6		35.9		
21	8 32	12	5		8 58	11	11		8 46	10	3		9 10	9	11		9 4	11	3		9 24	11	0		36.9		
22	9 26	11	6		9 58	11	3		9 34	9	8		10 1	9	6		9 50	10	8		10 21	10	5		37.9		
23	10 36	11	0		11 19	11	0		10 36	9	4		11 17	9	3		10 58	10	2		11 36	10	0		38.9		
24	—	—			0 3	11	3		12 0	9	4		—	—			—	—			0 15	10	0		39.9		
25	0 43	11	7		1 22	12	1		0 43	9	6		1 27	9	10		0 54	10	3		1 35	10	7		40.9		
26	1 55	12	8		2 27	13	4		2 6	10	3		2 42	10	8		2 16	11	0		2 57	11	6		41.9		
27	2 55	13	11		3 19	14	6		3 13	11	1		3 39	11	6		3 29	11	11		3 57	12	4		42.9		
28	3 43	15	0		4 7	15	5		4 5	11	11		4 30	12	3		4 26	12	8		4 53	12	11		43.9		
29	4 29	15	10		4 51	16	1		4 54	12	6		5 18	12	7		5 16	13	1		5 38	13	3		44.9		
30	5 13	16	3		5 35	16	2		5 40	12	8		6 2	12	8		6 0	13	4		6 22	13	4		45.9		
31	5 56	16	0		6 17	15	8		6 22	12	7		6 43	12	4		6 43	13	3		7 4	13	1		46.9		
at Mean Spring Range.				7ft. 5in.				5ft. 10in.				6ft. 2in.															

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
6 4	Sub.	9	5 18	Sub.	17	3 56	Sub.	25	2 1	Sub.
6 0		10	5 10		18	3 44		26	1 45	
5 56		11	5 1		19	3 31		27	1 28	
5 51		12	4 52		20	3 17		28	1 11	
5 46		13	4 42		21	3 3		29	0 53	
5 40		14	4 31		22	2 48		30	0 35	
5 33		15	4 20		23	2 33		31	0 17	
5 26		16	4 8		24	2 17				

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.



SEPTEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.						
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
		H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.		
Tu.	1	2m35	5 43	19 9	6 2	19 3	7 43	15 9	8 0	15 8	1 24	13 3	1 44	1 1	1 1	1 1	1 1	1 1	1 1		
W.	2	3 26	6 20	18 6	6 39	17 9	8 18	15 2	8 36	14 9	2 2	12 9	2 21	1 1	1 1	1 1	1 1	1 1	1 1		
Th.	3	4 17	6 59	16 9	7 20	15 11	8 52	14 3	9 9	13 9	2 40	12 0	3 0	1 1	1 1	1 1	1 1	1 1	1 1		
F.	4	5 7	7 42	15 0	8 8	14 1	9 28	13 4	9 47	12 8	3 20	11 3	3 40	1 1	1 1	1 1	1 1	1 1	1 1		
S.	5	5 57	8 35	13 4	9 8	12 10	10 9	12 5	10 35	11 7	4 5	10 5	4 31	1 1	1 1	1 1	1 1	1 1	1 1		
♄	6	6 47	9 48	12 6	10 31	12 5	11 2	11 8	11 42	11 0	5 3	9 8	5 41	1 1	1 1	1 1	1 1	1 1	1 1		
M.	7	7 35	11 16	12 6	11 57	12 10	—	—	0 25	11 7	6 21	9 4	7 5	1 1	1 1	1 1	1 1	1 1	1 1		
Tu.	8	8 22	—	—	0 35	13 3	1 7	11 3	1 47	12 3	7 44	9 7	8 24	1 1	1 1	1 1	1 1	1 1	1 1		
W.	9	9 7	1 8	13 11	1 33	14 6	2 25	11 10	2 58	13 1	8 59	10 3	9 25	1 1	1 1	1 1	1 1	1 1	1 1		
Th.	10	9 51	1 54	15 3	2 13	16 0	3 29	12 9	3 54	13 10	9 48	10 11	10 8	1 1	1 1	1 1	1 1	1 1	1 1		
F.	11	10 35	2 32	16 8	2 48	17 3	4 16	13 6	4 37	14 6	10 27	11 7	10 43	1 1	1 1	1 1	1 1	1 1	1 1		
S.	12	11 18	3 4	17 10	3 20	18 1	4 56	14 2	5 14	15 11	11 0	12 1	11 16	1 1	1 1	1 1	1 1	1 1	1 1		
♄	13	0 a 2	3 36	18 7	3 52	18 10	5 31	14 9	5 48	15 5	11 32	12 5	11 48	1 1	1 1	1 1	1 1	1 1	1 1		
M.	14	0 46	4 8	19 0	4 25	19 1	6 5	15 2	6 22	15 7	—	—	0 4	1 1	1 1	1 1	1 1	1 1	1 1		
Tu.	15	1 33	4 41	19 2	4 57	19 1	6 40	15 4	6 55	15 5	0 22	12 8	0 39	1 1	1 1	1 1	1 1	1 1	1 1		
W.	16	2 21	5 14	18 11	5 31	18 9	7 9	15 2	7 25	15 1	0 57	12 7	1 13	1 1	1 1	1 1	1 1	1 1	1 1		
Th.	17	3 13	5 49	18 5	6 6	18 1	7 43	14 11	8 0	14 8	1 32	12 5	1 49	1 1	1 1	1 1	1 1	1 1	1 1		
F.	18	4 7	6 26	17 7	6 46	16 11	8 18	14 6	8 37	14 1	2 7	12 2	2 28	1 1	1 1	1 1	1 1	1 1	1 1		
S.	19	5 4	7 10	16 3	7 37	15 6	8 56	14 0	9 20	13 5	2 47	11 8	3 10	1 1	1 1	1 1	1 1	1 1	1 1		
♄	20	6 2	8 6	14 10	8 39	14 4	9 45	13 5	10 10	12 8	3 35	11 1	4 3	1 1	1 1	1 1	1 1	1 1	1 1		
M.	21	7 0	9 18	14 1	10 3	14 11	10 46	12 11	11 24	12 2	4 35	10 6	5 12	1 1	1 1	1 1	1 1	1 1	1 1		
Tu.	22	7 57	10 51	14 3	11 36	14 9	—	—	0 9	12 10	5 55	10 2	6 40	1 1	1 1	1 1	1 1	1 1	1 1		
W.	23	8 53	—	—	0 17	15 4	0 57	12 5	1 43	13 7	7 23	10 7	8 5	1 1	1 1	1 1	1 1	1 1	1 1		
Th.	24	9 47	0 51	16 3	1 22	17 1	2 25	13 4	3 0	14 6	8 42	11 5	9 14	1 1	1 1	1 1	1 1	1 1	1 1		
F.	25	10 39	1 49	17 11	2 12	18 9	3 31	14 3	4 0	15 5	9 43	12 3	10 7	1 1	1 1	1 1	1 1	1 1	1 1		
S.	26	11 31	2 33	19 6	2 55	20 1	4 26	15 1	4 52	16 1	10 29	12 11	10 51	1 1	1 1	1 1	1 1	1 1	1 1		
♄	27	morn.	3 16	20 5	3 36	20 6	5 14	15 10	5 36	16 5	11 13	13 3	11 33	1 1	1 1	1 1	1 1	1 1	1 1		
M.	28	0 22	3 58	20 6	4 19	20 5	5 58	16 1	6 19	16 5	11 54	13 4	—	1 1	1 1	1 1	1 1	1 1	1 1		
Tu.	29	1 14	4 38	20 2	4 57	19 10	6 38	16 1	6 55	15 11	0 16	13 3	0 37	1 1	1 1	1 1	1 1	1 1	1 1		
W.	30	2 5	5 16	19 4	5 34	18 9	7 12	15 8	7 30	15 4	0 57	13 0	1 16	1 1	1 1	1 1	1 1	1 1	1 1		
Half Mean Spring } Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.						
Phases of the Moon.									Moon's Declination at Noon.												
			D.	H.	M.							M.D.	°	'	M.D.	°	'	M.D.	°	'	
Last Quarter -			5	1	9	Morning.							1	13	N. 1	9	14	N. 40	17	17	S. 40
New - - - - -			13	4	42	Morning.							2	16	35	10	11	9	18	19	59
First Quarter -			20	1	33	Afternoon.							3	19	14	11	7	8	19	21	12
Full - - - - -			27	6	2	Morning.							4	20	52	12	2	47	20	21	9
													5	21	28	13	1	8.44	21	19	46
In Apogee - -			8	11	0	Morning.							6	21	5	14	6	15	22	17	8
In Perigee - -			24	8	0	Morning.							7	19	45	15	10	33	23	13	25
													8	17	35	16	14	27	24	8	52

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
BREST add 18 m.                      DEVONPORT add 17 m.                      PORTSMOUTH add 4 :

## SEPTEMBER, 1863.

DOVER.						SHEERNESS.						LONDON.						C's AGL. AT NOON.	
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.				
me.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.			
M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	D.		
1	19	9	1	22	19	5	2	35	16	11	2	54	16	9	4	6	20	2	17'9
42	19	0	2	1	18	6	3	12	16	5	3	31	16	1	4	44	19	8	18'9
21	17	10	2	42	17	2	3	50	15	8	4	9	15	2	5	23	18	10	19'9
1	16	6	3	21	15	9	4	30	14	8	4	50	14	2	6	2	17	11	20'9
16	15	1	4	10	14	5	5	14	13	8	5	42	13	3	6	47	16	9	21'9
0	13	10	5	14	13	5	6	11	12	10	6	47	12	6	7	43	15	10	22'9
1	13	3	6	31	13	5	7	29	12	4	8	13	12	4	8	57	15	2	23'9
0	13	9	7	50	14	2	8	56	12	6	9	35	12	10	10	21	15	1	24'9
1	14	9	8	48	15	3	10	12	13	2	10	44	13	6	11	39	15	6	25'9
1	15	9	9	31	16	3	11	7	13	9	11	28	14	3	0	11	15	10	26'9
1	16	9	10	9	17	2	11	46	14	7	—	—	—	—	0	55	16	8	27'9
7	17	7	10	44	17	11	0	4	14	11	0	20	15	2	1	34	17	6	28'9
1	18	3	11	20	18	5	0	37	15	6	0	53	15	9	2	8	18	2	29'9
7	18	7	11	55	18	8	1	9	15	11	1	24	16	1	2	38	18	9	30'9
—	—	—	0	13	18	9	1	40	16	2	1	56	16	2	3	9	19	1	31'9
1	18	9	0	50	18	8	2	12	16	2	2	28	16	1	3	42	19	3	32'9
0	18	6	1	29	18	4	2	44	16	0	3	1	15	10	4	14	19	2	33'9
7	18	1	2	8	17	9	3	18	15	8	3	36	15	5	4	48	18	10	34'9
9	17	3	2	51	16	9	3	56	15	2	4	17	14	9	5	28	18	4	35'9
6	16	3	3	44	15	8	4	40	14	4	5	7	14	0	6	12	17	6	36'9
4	15	2	4	48	14	10	5	39	13	8	6	15	13	4	7	7	16	9	37'9
17	14	8	6	7	14	9	6	57	13	2	7	45	13	3	8	27	16	2	38'9
19	15	3	7	31	15	11	8	32	13	5	9	14	13	9	9	57	16	2	39'9
7	16	7	8	37	17	3	9	54	14	4	10	26	14	9	11	20	16	10	40'9
6	17	11	9	31	18	6	10	56	15	3	11	22	15	8	—	—	—	—	41'9
55	19	0	10	19	19	5	11	44	16	1	—	—	—	—	0	50	18	4	42'9
41	19	8	11	5	19	9	0	6	16	6	0	28	16	9	1	36	19	3	43'9
27	19	10	11	49	19	9	0	49	16	11	1	9	17	0	2	19	19	10	44'9
—	—	—	0	11	19	7	1	30	16	11	1	50	16	10	3	0	20	1	45'9
32	19	4	0	53	19	0	2	9	16	8	2	28	16	6	3	39	19	11	46'9
an Spring } age.			9ft. 4in.			8ft. 0in.						9ft. 7in.							

an Spring } 9ft. 4in.  
age.

8ft. 0in.

9ft. 7in.

## Equation of Time at Noon.

M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
1	2		9	2	39	17	5	26	25	8	14
2	21		10	3	0	18	5	47	26	8	34
3	40		11	3	20	19	6	8	27	8	55
4	59		12	3	41	20	6	29	28	9	15
5	19		13	4	2	21	6	50	29	9	35
6	39		14	4	23	22	7	11	30	9	54
7	59		15	4	44	23	7	32			
8	19		16	5	5	24	7	53			

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
Dover subtract 5 m. | SHEERNESS subtract 8 m. | LONDON 0 m.



## SEPTEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.																								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTER.																				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.																							
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																							
Tu.	1	3 m 35	1 51	10 2	2 9	10 0	1 1 27	4	1 20	26 9	8 10	21 8	8 29	2																													
W.	2	3 26	2 28	9 10	2 46	9 8	1 38	26 0	1 56	25 2	8 48	20 5	9 7	1																													
Th.	3	4 17	3 4	9 5	3 24	9 3	2 15	24 4	2 35	23 4	9 26	18 9	9 44	1																													
F.	4	5 7	3 43	9 0	4 4	8 9	2 54	22 5	3 15	21 6	10 3	17 1	10 25	1																													
S.	5	5 57	4 30	8 6	4 56	8 3	3 42	20 6	4 10	19 8	10 48	15 10	11 16	1																													
♄.	6	6 47	5 28	8 1	6 7	7 11	4 46	19 0	5 29	18 8	11 50	14 3	—	1																													
M.	7	7 35	6 47	7 9	7 30	7 9	6 14	18 7	7 0	18 10	0 28	14 2	1 14	1																													
Tu.	8	8 22	8 9	7 11	8 47	8 1	7 39	19 3	8 16	19 10	1 58	14 6	2 39	1																													
W.	9	9 7	9 21	8 3	9 46	8 5	8 47	20 7	9 10	21 3	3 15	15 9	3 42	1																													
Th.	10	9 51	10 9	8 8	10 29	8 10	9 30	22 1	9 48	22 9	4 7	17 2	4 29	1																													
F.	11	10 35	10 48	8 11	11 6	9 10	5 23	5	10 21	23 11	4 50	18 6	5 9	1																													
S.	12	11 18	11 24	9 3	11 41	9 4	10 38	24 6	10 55	24 11	5 28	19 7	5 46	1																													
♄.	13	0 a 2	11 59	9 6	—	—	11 11	25 4	11 27	25 8	6 30	20 5	6 18	1																													
M.	14	0 46	0 16	9 7	0 32	9 8	11 43	25 11	12 0	26 0	6 34	20 11	6 51	1																													
Tu.	15	1 33	0 49	9 9	1 6	9 9	—	—	0 17	26 1	7 7	21 2	7 23	1																													
W.	16	2 21	1 23	9 9	1 40	9 9	0 34	26 1	0 51	25 11	7 40	20 10	7 58	1																													
Th.	17	3 13	1 57	9 9	2 15	9 8	1 8	25 7	1 25	25 2	8 16	20 4	8 34	1																													
F.	18	4 7	2 33	9 6	2 52	9 5	1 42	24 9	2 2	24 2	8 54	19 6	9 13	1																													
S.	19	5 4	3 11	9 3	3 33	9 1	2 22	23 6	2 44	22 10	9 34	18 3	9 57	1																													
♄.	20	6 2	3 59	8 11	4 28	8 9	3 10	22 1	3 39	21 4	10 24	17 0	10 51	1																													
M.	21	7 0	5 0	8 7	5 38	8 5	4 15	20 9	4 56	20 4	11 24	15 11	—	1																													
Tu.	22	7 57	6 21	8 4	7 6	8 4	5 45	20 4	6 35	20 9	0 4	15 10	0 48	1																													
W.	23	8 53	7 48	8 6	8 29	8 9	7 18	21 5	7 57	22 2	1 36	16 5	2 20	1																													
Th.	24	9 47	9 4	9 0	9 35	9 3	8 29	23 2	8 58	24 2	2 58	18 0	3 32	1																													
F.	25	10 39	10 4	9 5	10 28	9 7	9 24	25 0	9 46	25 10	4 3	19 10	4 30	1																													
S.	26	11 31	10 52	9 9	11 16	9 11	10 8	26 6	10 30	27 0	4 55	21 4	5 20	1																													
♄.	27	morn.	11 38	10 0	12 0	10 1	10 51	27 3	11 12	27 6	5 43	22 2	6 4	1																													
M.	28	0 22	—	—	0 21	10 2	11 33	27 7	11 54	27 6	6 24	22 5	6 45	1																													
Tu.	29	1 14	0 43	10 2	1 4	10 1	—	—	0 14	27 3	7 5	22 2	7 24	1																													
W.	30	2 5	1 23	10 0	1 42	9 11	0 34	26 10	0 53	26 2	7 42	21 3	8 1	1																													
Half Mean Spring Range.			4 ft.				10 in.				13 ft.				0 in.				10 ft.				6 in.																				
Phases of the Moon.																						Moon's Declination at Noon.																					
			D.	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'																						
Last Quarter -			5	1	9	Morning.	1	13	N. 1	9	14	N. 40	17	17	S. 40	25																											
New - - - - -			13	4	42	Morning.	2	16	35	10	11	9	18	19	59	26																											
First Quarter -			20	1	33	Afternoon.	3	19	14	11	7	8	19	21	12	27																											
Full - - - - -			27	6	2	Morning.	4	20	52	12	2	47	20	21	9	28																											
							5	21	28	13	1	S. 44	21	19	46	29																											
In Apogee - -			8	11	0	Morning.	6	21	5	14	6	15	22	17	8	30																											
In Perigee - -			24	8	0	Morning.	7	19	45	15	10	33	23	13	25																												
							8	17	35	16	14	27	24	8	52																												

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

SEPTEMBER, 1863.

NORTH SHIELDS.					LEITH.					THURSO.					C's AGE AT NOON.								
MORNING.			AFTERNOON.		MORNING.			AFTERNOON.		MORNING.			AFTERNOON.										
Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		D.							
21	13	9	5	41	13	5	4	16	16	11	4	36	16	7	10	26	13	6	10	47	13	0	17.9
2	13	1	6	21	12	8	4	55	16	2	5	15	15	8	11	7	12	6	11	28	11	11	18.9
4	12	2	7	2	11	8	5	36	15	2	5	59	14	6	11	50	11	4	—	—	—	—	19.9
24	11	2	7	50	10	7	6	21	13	11	6	45	13	4	0	12	10	9	0	37	10	2	20.9
20	10	0	8	51	9	7	7	15	12	9	7	45	12	3	1	6	9	8	1	36	9	3	21.9
30	9	3	10	12	9	1	8	22	11	11	9	5	11	8	2	14	8	10	2	58	8	7	22.9
52	9	2	11	34	9	3	9	47	11	8	10	27	11	9	3	44	8	6	4	27	8	7	23.9
—	—	—	0	11	9	6	11	4	12	0	11	38	12	4	5	5	8	8	5	40	9	0	24.9
15	9	10	1	15	10	2	—	—	—	—	0	9	12	9	6	11	9	5	6	33	9	11	25.9
7	10	6	1	56	10	11	0	31	13	2	0	50	13	8	6	51	10	6	7	6	11	0	26.9
4	11	3	2	32	11	9	1	9	14	2	1	27	14	8	7	21	11	6	7	35	12	0	27.9
7	12	1	3	2	12	5	1	43	15	1	1	59	15	5	7	49	12	5	8	4	12	9	28.9
7	12	8	3	32	12	11	2	15	15	9	2	31	16	0	8	19	13	0	8	33	13	2	29.9
3	13	1	4	3	13	3	2	45	16	2	3	0	16	3	8	48	13	3	9	4	13	3	30.9
13	3	3	4	37	13	3	3	16	16	4	3	32	16	3	9	21	13	3	9	38	13	2	31.9
13	1	1	5	11	12	11	3	48	16	2	4	5	16	0	9	55	13	0	10	14	12	10	32.9
12	9	5	5	48	12	7	4	23	15	10	4	43	15	7	10	34	12	6	10	53	12	3	33.9
12	5	6	6	27	12	1	5	2	15	4	5	23	15	1	11	15	11	10	11	37	11	5	34.9
11	9	7	7	14	11	4	5	45	14	8	6	11	14	2	—	—	—	—	0	2	11	0	35.9
10	1	8	8	17	10	5	6	38	13	8	7	12	13	3	0	30	10	7	1	3	10	2	36.9
10	2	9	9	40	10	0	7	50	12	11	8	32	12	9	1	41	9	11	2	24	9	8	37.9
10	1	1	1	10	10	4	9	20	12	9	10	4	12	11	3	15	9	8	4	3	9	9	38.9
10	9	—	—	—	—	—	10	44	13	4	11	20	13	9	4	45	10	0	5	22	10	5	39.9
11	2	0	0	57	11	7	11	52	14	3	—	—	—	—	5	53	11	0	6	20	11	8	40.9
12	1	1	1	50	12	6	0	19	14	11	0	44	15	6	6	43	12	4	7	3	13	0	41.9
13	0	2	2	33	13	6	1	7	16	1	1	29	16	7	7	21	13	6	7	40	14	0	42.9
3	13	10	3	13	14	0	1	51	17	0	2	12	17	3	8	0	14	3	8	19	14	4	43.9
3	14	2	3	53	14	2	2	31	17	4	2	50	17	4	8	38	14	3	8	58	14	2	44.9
4	14	1	4	34	13	10	3	10	17	2	3	30	16	11	9	19	13	11	9	39	13	7	45.9
4	13	6	5	14	13	2	3	49	16	7	4	8	16	3	9	58	13	3	10	18	12	9	46.9
Spring }			6ft. 8in.					8ft. 2in.					6ft. 7in.										

Equation of Time at Noon.

S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
2		9	2 39		17	5 26		25	8 14	
21		10	3 0		18	5 47		26	8 34	
40		11	3 20		19	6 8		27	8 55	
59		12	3 41		20	6 29		28	9 15	
1 19		13	4 2		21	6 50		29	9 35	
1 39		14	4 23		22	7 11		30	9 54	
1 59		15	4 44		23	7 32				
2 19		16	5 5		24	7 53				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.

SEPTEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.							
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTER.					
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.				
			H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.				
Tu.	1	2 m 35	1 51	10 2	2 9	10 0	1 1	27 4	1 20	26 9	8 10	21 8	8 29					
W.	2	3 26	2 28	9 10	2 46	9 8	1 38	26 0	1 56	25 2	8 48	20 5	9 7					
Th.	3	4 17	3 4	9 5	3 24	9 3	2 15	24 4	2 35	23 4	9 26	18 9	9 44					
F.	4	5 7	3 43	9 0	4 4	8 9	2 54	22 5	3 15	21 6	10 3	17 1	10 25					
S.	5	5 57	4 30	8 6	4 56	8 3	3 42	20 6	4 10	19 8	10 48	15 10	11 16					
S.	6	6 47	5 28	8 1	6 7	7 11	4 46	19 0	5 29	18 8	11 50	14 3	—					
M.	7	7 35	6 47	7 9	7 30	7 9	6 14	18 7	7 0	18 10	0 28	14 2	1 14					
Tu.	8	8 22	8 9	7 11	8 47	8 1	7 39	19 3	8 16	19 10	1 58	14 6	2 39					
W.	9	9 7	9 21	8 3	9 46	8 5	8 47	20 7	9 10	21 3	3 15	15 9	3 42					
Th.	10	9 51	10 9	8 8	10 29	8 10	9 30	22 1	9 48	22 9	4 7	17 2	4 29					
F.	11	10 35	10 48	8 11	11 6	9 1	10 5	23 5	10 21	23 11	4 50	18 6	5 9					
S.	12	11 18	11 24	9 3	11 41	9 4	10 38	24 6	10 55	24 11	5 28	19 7	5 46					
S.	13	0 2	11 59	9 6	—	—	11 11	25 4	11 27	25 8	6 3	20 5	6 18					
M.	14	0 46	0 16	9 7	0 32	9 8	11 43	25 11	12 0	26 0	6 34	20 11	6 51					
Tu.	15	1 33	0 49	9 9	1 6	9 9	—	—	0 17	26 1	7 7	21 2	7 23					
W.	16	2 21	1 23	9 9	1 40	9 9	0 34	26 1	0 51	25 11	7 40	20 10	7 58					
Th.	17	3 13	1 57	9 9	2 15	9 8	1 8	25 7	1 25	25 2	8 16	20 4	8 34					
F.	18	4 7	2 33	9 6	2 52	9 5	1 42	24 9	2 2	24 6	8 54	19 6	9 13					
S.	19	5 4	3 11	9 3	3 33	9 1	2 22	23 6	2 44	22 10	9 34	18 3	9 57					
S.	20	6 2	3 59	8 11	4 28	8 9	3 10	22 1	3 39	21 4	10 24	17 0	10 51					
M.	21	7 0	5 0	8 7	5 38	8 5	4 15	20 9	4 56	20 4	11 24	15 11	—					
Tu.	22	7 57	6 21	8 4	7 6	8 4	5 45	20 4	6 35	20 9	0 4	15 10	0 48					
W.	23	8 53	7 48	8 6	8 29	8 9	7 18	21 5	7 57	22 2	1 36	16 5	2 20					
Th.	24	9 47	9 4	9 0	9 35	9 3	8 29	23 0	8 58	24 2	2 58	18 0	3 32					
F.	25	10 39	10 4	9 5	10 28	9 7	9 24	25 0	9 46	25 10	4 3	19 10	4 30					
S.	26	11 31	10 52	9 9	11 16	9 11	10 8	26 6	10 30	27 0	4 55	21 4	5 20					
S.	27	morn.	11 38	10 0	12 0	10 1	10 51	27 3	11 12	27 6	5 43	22 2	6 4					
M.	28	0 22	—	—	0 21	10 2	11 33	27 7	11 54	27 6	6 24	22 5	6 45					
Tu.	29	1 14	0 43	10 2	1 4	10 1	—	—	0 14	27 3	7 5	22 2	7 24					
W.	30	2 5	1 23	10 0	1 42	9 11	0 34	26 10	0 53	26 2	7 42	21 3	8 1					
Half Mean Spring Range.			4ft. 10in.				13ft. 0in.				10ft. 6in.							
Phases of the Moon.							Moon's Declination at Noon.											
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
Last Quarter - 5 1 9 Morning.							1	13 N.	1	9	14 N.	40	17	17 S.	40	25		
New - - - - - 13 4 42 Morning.							2	16	35	10	11	9	18	19	59	26		
First Quarter - 20 1 33 Afternoon.							3	19	14	11	7	8	19	21	12	27		
Full - - - - - 27 6 2 Morning.							4	20	52	12	2	47	20	21	9	28		
							5	21	28	13	1 S.	44	21	19	46	29		
In Apogee - - 8 11 0 Morning.							6	21	5	14	6	15	22	17	8	30		
In Perigee - - 24 8 0 Morning.							7	19	45	15	10	33	23	13	25			
							8	17	35	16	14	27	24	8	52			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
GREENOCK add 19 m. LIVERPOOL add 12 m. PEMBROKE add 20 m.

## SEPTEMBER, 1863.

WEEK DAY.	MONTH DAY.	GALWAY.				QUEENSTOWN.				WATERFORD.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.	
Tu.	1	6 36	15 3	6 56	14 10	7 2	12 1	7 21	11 9	7 23	12 11	7 41	12 8	17.9
W.	2	7 15	14 3	7 35	13 9	7 39	11 5	7 57	11 0	7 59	12 4	8 17	12 0	18.9
Th.	3	7 56	13 1	8 18	12 4	8 16	10 8	8 34	10 2	8 35	11 7	8 51	11 2	19.9
F.	4	8 42	11 8	9 8	11 0	8 55	9 9	9 18	9 4	9 9	10 9	9 32	10 4	20.9
S.	5	9 37	10 6	10 12	10 1	9 41	9 0	10 12	8 8	9 59	9 11	10 35	9 7	21.9
S.	6	10 53	9 10	11 36	9 10	10 52	8 6	11 33	8 5	11 12	9 3	11 50	9 2	22.9
M.	7	—	—	0 18	10 0	—	—	0 16	8 6	—	—	0 29	9 3	23.9
Tu.	8	0 55	10 3	1 30	10 7	0 56	8 8	1 35	8 11	1 7	9 4	1 44	9 7	24.9
W.	9	2 1	11 0	2 23	11 6	2 10	9 2	2 38	9 5	2 20	9 11	2 49	10 3	25.9
Th.	10	2 44	12 0	3 4	12 5	3 1	9 9	3 22	10 2	3 15	10 7	3 38	10 11	26.9
F.	11	3 23	12 10	3 39	13 3	3 42	10 6	4 0	10 9	4 0	11 3	4 20	11 6	27.9
S.	12	3 55	13 8	4 11	14 0	4 17	10 11	4 34	11 3	4 39	11 9	4 57	11 11	28.9
S.	13	4 27	14 4	4 42	14 7	4 51	11 5	5 8	11 8	5 14	12 1	5 29	12 3	29.9
M.	14	4 57	14 9	5 14	14 10	5 24	11 9	5 42	11 9	5 44	12 4	6 1	12 5	30.9
Tu.	15	5 31	14 11	5 48	14 10	5 58	11 10	6 15	11 9	6 19	12 6	6 36	12 6	31.9
W.	16	6 6	14 8	6 24	14 6	6 32	11 9	6 50	11 7	6 53	12 5	7 1	12 4	32.9
Th.	17	6 42	14 3	7 1	14 0	7 8	11 5	7 26	11 3	7 28	12 3	7 45	12 1	33.9
F.	18	7 22	13 7	7 44	13 2	7 45	11 0	8 4	10 8	8 3	11 11	8 22	11 8	34.9
S.	19	8 8	12 8	8 35	12 1	8 24	10 4	8 48	10 0	8 42	11 4	9 3	11 1	35.9
S.	20	9 6	11 7	9 41	11 2	9 16	9 9	9 45	9 6	9 30	10 9	10 4	10 5	36.9
M.	21	10 22	11 0	11 8	11 10	10 22	9 4	11 6	9 3	10 44	10 2	11 26	10 0	37.9
Tu.	22	11 54	11 3	—	—	11 52	9 4	—	—	—	—	0 6	10 1	38.9
W.	23	0 35	11 8	1 12	12 2	0 35	9 7	1 17	9 11	0 46	10 4	1 25	10 8	39.9
Th.	24	1 43	12 9	2 11	13 5	1 54	10 3	2 27	10 8	2 4	11 1	2 40	11 6	40.9
F.	25	2 39	13 11	3 3	14 6	2 57	11 1	3 22	11 6	3 12	11 11	3 40	12 3	41.9
S.	26	3 25	14 11	3 46	15 4	3 46	11 10	4 9	12 2	4 6	12 7	4 31	12 10	42.9
S.	27	4 8	15 7	4 28	15 10	4 31	12 4	4 52	12 5	4 54	13 0	5 15	13 1	43.9
M.	28	4 47	15 11	5 8	15 10	5 14	12 6	5 36	12 5	5 35	13 1	5 56	13 1	44.9
Tu.	29	5 29	15 8	5 49	15 4	5 56	12 4	6 15	12 2	6 16	13 0	6 36	12 10	45.9
W.	30	6 8	14 11	6 27	14 6	6 34	11 11	6 53	11 7	6 56	12 8	7 15	12 5	46.9
Half Mean Spring Range.		7ft. 5in.				5ft. 10in.				6ft. 2in.				

## Equation of Time at Noon.

M.D.	M.	S.	Add.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.
1	0	2	Add.	9	2	39	Add.	17	5	26	Add.	25	8	14	Add.
2	0	21		10	3	0		18	5	47		26	8	34	
3	0	40		11	3	20		19	6	8		27	8	55	
4	0	59		12	3	41		20	6	29		28	9	15	
5	1	19		13	4	2		21	6	50		29	9	35	
6	1	39		14	4	23		22	7	11		30	9	54	
7	1	59		15	4	44		23	7	32					
8	2	19		16	5	5		24	7	53					

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## SEPTEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
			H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.				
Tu.	1	2m35	0 26	9 9		0 46	9 7		9 52	7 9		10 10	7 6		7 15	11 3		7 34	10 11				
W.	2	3 26	1 7	9 5		1 28	9 3		10 29	7 3		10 49	6 11		7 53	10 6		8 11	10 0				
Th.	3	4 17	1 49	9 1		2 12	8 10		11 12	6 7		11 39	6 2		8 33	9 7		8 55	9 2				
F.	4	5 7	2 36	8 8		3 1	8 5		—	—		0 9	5 10		9 22	8 9		9 54	8 4				
S.	5	5 57	3 29	8 3		3 57	8 1		0 46	5 6		1 23	5 4		10 26	8 0		11 4	7 16				
♄.	6	6 47	4 33	7 11		5 11	7 10		2 7	5 2		2 49	5 2		11 45	7 9		—	—				
M.	7	7 35	5 50	7 9		6 32	7 8		3 28	5 4		4 5	5 6		0 24	7 8		1 6	7 9				
Tu.	8	8 22	7 10	7 9		7 46	7 11		4 37	5 8		5 7	5 10		1 43	7 11		2 19	8 2				
W.	9	9 7	8 17	8 1		8 40	8 3		5 33	6 1		5 52	6 3		2 50	8 6		3 11	8 10				
Th.	10	9 51	9 0	8 6		9 18	8 8		6 10	6 6		6 28	6 8		3 30	9 3		3 46	9 7				
F.	11	10 35	9 36	8 10		9 53	9 0		6 47	6 11		7 4	7 1		4 3	9 11		4 18	10 3				
S.	12	11 18	10 9	9 2		10 25	9 3		7 21	7 3		7 38	7 5		4 35	10 6		4 51	10 9				
♄.	13	0a 2	10 40	9 4		10 55	9 5		7 54	7 6		8 8	7 8		5 8	11 0		5 24	11 2				
M.	14	0 46	11 10	9 5		11 25	9 5		8 23	7 9		8 38	7 9		5 40	11 3		5 55	11 3				
Tu.	15	1 33	11 41	9 5		11 57	9 5		8 53	7 8		9 8	7 7		6 11	11 3		6 27	11 2				
W.	16	2 21	—	—		0 15	9 5		9 24	7 6		9 41	7 4		6 45	11 0		7 3	10 10				
Th.	17	3 13	0 34	9 4		0 53	9 3		9 57	7 3		10 15	7 1		7 21	10 6		7 39	10 3				
F.	18	4 7	1 12	9 2		1 35	9 1		10 36	6 10		10 58	6 7		7 59	10 0		8 20	9 8				
S.	19	5 4	2 0	8 11		2 26	8 9		11 28	6 4		—	—		8 45	9 4		9 16	9 0				
♄.	20	6 2	2 54	8 7		3 26	8 5		0 2	6 0		0 43	5 9		9 51	8 9		10 31	8 8				
M.	21	7 0	4 2	8 3		4 43	8 2		1 28	5 8		2 17	5 8		11 14	8 5		11 59	8 6				
Tu.	22	7 57	5 26	8 2		6 8	8 2		3 3	5 10		3 43	6 1		—	—		0 42	8 8				
W.	23	8 53	6 50	8 3		7 28	8 5		4 19	6 5		4 49	6 8		1 23	8 11		2 1	9 8				
Th.	24	9 47	8 0	8 8		8 28	8 11		5 15	6 11		5 40	7 2		2 32	9 8		2 59	10 1				
F.	25	10 39	8 54	9 2		9 16	9 5		6 4	7 6		6 27	7 9		3 23	10 7		3 43	11 0				
S.	26	11 31	9 38	9 7		10 0	9 9		6 50	7 11		7 13	8 1		4 4	11 4		4 26	11 8				
♄.	27	morn.	10 20	9 10		10 40	9 10		7 34	8 2		7 54	8 3		4 48	11 10		5 9	12 4				
M.	28	0 22	11 0	9 10		11 19	9 9		8 13	8 3		8 32	8 2		5 30	12 0		5 49	11 11				
Tu.	29	1 14	11 38	9 8		11 58	9 7		8 50	8 1		9 8	7 10		6 8	11 9		6 28	11 8				
W.	30	2 5	—	—		0 18	9 6		9 26	7 7		9 43	7 4		6 47	11 2		7 6	10 4				
Half Mean Spring } Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.								
Phases of the Moon.												Moon's Declination at Noon.											
												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
Last Quarter - 5 1 9 Morning.												1	13	N. 1	9	14	N. 40	17	17	S. 40	25	3	S. 4
New - - - - - 13 4 42 Morning.												2	16	35	10	11	9	18	19	59	26	1	N. 2
First Quarter - 20 1 33 Afternoon.												3	19	14	11	7	8	19	21	12	27	6	3
Full - - - - - 27 6 2 Morning.												4	20	52	12	2	47	20	21	9	28	11	10
												5	21	28	13	18	44	21	19	46	29	15	6
												6	21	5	14	6	15	22	17	8	30	18	11
In Apogee - - 8 11 0 Morning.												7	19	45	15	10	33	23	13	25			
In Perigee - - 24 8 0 Morning.												8	17	35	16	14	27	24	8	52			

The times for High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—

BELFAST subtract 2 m.

LONDONDERRY add 4 m.

SLIGO BAY add 0 m.

## SEPTEMBER, 1863.

MONTH DAY.	GALWAY.								QUEENSTOWN.								WATERFORD.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			
	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	D.
1	6	36	15	3	6	56	14	10	7	2	12	1	7	21	11	9	7	23	12	11	7	41	12	8	17.9
2	7	15	14	3	7	35	13	9	7	39	11	5	7	57	11	0	7	59	12	4	8	17	12	0	18.9
3	7	56	13	1	8	18	12	4	8	16	10	8	8	34	10	2	8	35	11	7	8	51	11	2	19.9
4	8	42	11	8	9	8	11	0	8	55	9	9	9	18	9	4	9	9	10	9	9	32	10	4	20.9
5	9	37	10	6	10	12	10	1	9	41	9	0	10	12	8	8	9	59	9	11	10	35	9	7	(
6	10	53	9	10	11	36	9	10	10	52	8	6	11	33	8	5	11	12	9	3	11	50	9	2	22.9
7	—	—	—	—	0	18	10	0	—	—	—	—	0	16	8	6	—	—	—	—	0	29	9	3	23.9
8	0	55	10	3	1	30	10	7	0	56	8	8	1	35	8	11	1	7	9	4	1	44	9	7	24.9
9	2	1	11	0	2	23	11	6	2	10	9	2	2	38	9	5	2	20	9	11	2	49	10	3	25.9
9	2	44	12	0	3	4	12	5	3	1	9	9	3	22	10	2	3	15	10	7	3	38	10	11	26.9
11	3	23	12	10	3	39	13	3	3	42	10	6	4	0	10	9	4	0	11	3	4	20	11	6	27.9
2	3	55	13	8	4	11	14	0	4	17	10	11	4	34	11	3	4	39	11	9	4	57	11	11	28.9
3	4	27	14	4	4	42	14	7	4	51	11	5	5	8	11	8	5	14	12	1	5	29	12	3	●
4	4	57	14	9	5	14	14	10	5	24	11	9	5	42	11	9	5	44	12	4	6	1	12	5	1.3
5	5	31	14	11	5	48	14	10	5	58	11	10	6	15	11	9	6	19	12	6	6	36	12	6	2.3
5	6	6	14	8	6	24	14	6	6	32	11	9	6	50	11	7	6	53	12	5	7	11	12	4	3.3
7	6	42	14	3	7	1	14	0	7	8	11	5	7	26	11	3	7	28	12	3	7	45	12	1	4.3
8	7	22	13	7	7	44	13	2	7	45	11	0	8	4	10	8	8	3	11	11	8	22	11	8	5.3
8	8	8	12	8	8	35	12	1	8	24	10	4	8	48	10	0	8	42	11	4	9	3	11	1	6.3
9	9	6	11	7	9	41	11	2	9	16	9	9	9	45	9	6	9	30	10	9	10	4	10	5	7.3
10	10	22	11	0	11	8	11	10	10	22	9	4	11	6	9	3	10	44	10	2	11	26	10	0	8.3
11	11	54	11	3	—	—	—	11	52	9	4	—	—	—	—	—	—	—	—	—	0	6	10	1	9.3
12	0	35	11	8	1	12	12	2	0	35	9	7	1	17	9	11	0	46	10	4	1	25	10	8	10.3
13	1	43	12	9	2	11	13	5	1	54	10	3	2	27	10	8	2	4	11	1	2	40	11	6	11.3
14	2	39	13	11	3	3	14	6	2	57	11	1	3	22	11	6	3	12	11	11	3	40	12	3	12.3
15	3	25	14	11	3	46	15	4	3	46	11	10	4	9	12	2	4	6	12	7	4	31	12	10	13.3
16	4	8	15	7	4	28	15	10	4	31	12	4	4	52	12	5	4	54	13	0	5	15	13	1	○
17	4	47	15	11	5	8	15	10	5	14	12	6	5	36	12	5	5	35	13	1	5	56	13	1	15.3
18	5	29	15	8	5	49	15	4	5	50	12	4	6	15	12	2	6	16	13	0	6	36	12	10	16.3
19	6	8	14	11	6	27	14	6	6	34	11	11	6	53	11	7	6	56	12	8	7	15	12	5	17.3
Mean Spring Range.				7ft. 5in.				5ft. 10in.				6ft. 2in.													

## Equation of Time at Noon.

M.	S.	Add.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.
0	2		9	2	39		17	5	26		25	8	14	
0	21		10	3	0		18	5	47		26	8	34	
0	40		11	3	20		19	6	8		27	8	55	
0	59		12	3	41		20	6	29		28	9	15	
1	19		13	4	2		21	6	50		29	9	35	
1	39		14	4	23		22	7	11		30	9	54	
1	59		15	4	44		23	7	32					
2	19		16	5	5		24	7	53					

Times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.



## OCTOBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.			
Th.	1	2m57	5 52	18 2	6 11	17 6	7 47	15 0	8 4	14 6	1 35	12 6	1 53	12 3	2 32	11 6	2 32	11 6					
F.	2	3 48	6 31	16 8	6 52	15 10	8 21	14 3	8 37	13 6	2 12	11 11	2 32	11 6	3 13	10 10	3 13	10 10					
S.	3	4 39	7 14	15 0	7 37	14 2	8 55	13 5	9 12	12 6	2 53	11 2	3 13	10 10	3 58	10 1	3 58	10 1					
♄.	4	5 28	8 1	13 6	8 29	12 11	9 34	12 6	9 59	11 7	3 35	10 5	3 58	10 1	4 58	9 6	4 58	9 6					
M.	5	6 16	9 4	12 7	9 43	12 5	10 28	11 10	11 0	11 0	4 25	9 9	4 58	9 6	6 18	9 4	6 18	9 4					
Tu.	6	7 2	10 29	12 5	11 11	12 8	11 40	11 8	—	—	5 35	9 4	6 18	9 4	7 37	9 9	7 37	9 9					
W.	7	7 46	11 50	13 1	—	—	0 22	11 1	1 3	12 1	7 0	9 6	7 37	9 9	8 42	10 6	8 42	10 6					
Th.	8	8 30	0 23	13 8	0 52	14 3	1 42	11 9	2 17	12 9	8 11	10 1	8 42	10 6	9 28	11 2	9 28	11 2					
F.	9	9 13	1 16	14 11	1 36	15 8	2 45	12 7	3 13	13 7	9 7	10 10	9 28	11 2	10 7	11 5	10 7	11 5					
S.	10	9 57	1 55	16 5	2 12	17 1	3 37	13 6	4 1	14 5	9 49	11 6	10 7	11 5	10 42	12 3	10 42	12 3					
♄.	11	10 41	2 29	17 9	2 46	18 3	4 21	14 3	4 41	15 0	10 25	12 1	10 42	12 3	11 17	12 3	11 17	12 3					
M.	12	11 27	3 4	18 9	3 21	19 1	5 0	15 0	5 18	15 5	11 0	12 5	11 17	12 3	11 51	12 3	11 51	12 3					
Tu.	13	0a16	3 39	19 3	3 56	19 5	5 35	15 4	5 53	15 7	11 35	12 9	11 51	12 3	0 11	12 10	0 11	12 10					
W.	14	1 8	4 14	19 6	4 32	19 5	6 11	15 7	6 30	15 7	—	—	0 11	12 10	0 51	12 8	0 51	12 8					
Th.	15	2 3	4 51	19 4	5 9	19 1	6 47	15 6	7 5	15 3	0 31	12 9	0 51	12 8	1 30	12 6	1 30	12 6					
F.	16	2 59	5 28	18 9	5 50	18 4	7 23	15 3	7 42	14 11	1 10	12 7	1 30	12 6	2 13	12 1	2 13	12 1					
S.	17	3 57	6 12	17 10	6 34	17 3	8 4	14 11	8 25	14 4	1 51	12 4	2 13	12 1	3 0	11 1	3 0	11 1					
♄.	18	4 55	7 0	16 7	7 29	15 10	8 45	14 5	9 10	13 7	2 35	11 10	3 0	11 1	3 56	10 1	3 56	10 1					
M.	19	5 52	7 59	15 2	8 31	14 8	9 38	13 9	10 8	12 10	3 27	11 3	3 56	10 1	5 3	10 1	5 3	10 1					
Tu.	20	6 47	9 9	14 5	9 50	14 5	10 41	13 3	11 20	12 5	4 27	10 8	5 3	10 1	6 27	10 1	6 27	10 1					
W.	21	7 40	10 38	14 7	11 20	15 0	—	—	0 5	13 2	5 42	10 4	6 27	10 1	7 46	11 1	7 46	11 1					
Th.	22	8 31	11 59	15 6	—	—	0 50	12 8	1 32	13 8	7 8	10 8	7 46	11 1	8 51	11 1	8 51	11 1					
F.	23	9 21	0 30	16 1	1 0	16 9	2 8	13 4	2 40	14 5	8 20	11 4	8 51	11 1	9 44	12 1	9 44	12 1					
S.	24	10 12	1 25	17 6	1 49	18 2	3 11	14 4	3 38	15 2	9 19	12 1	9 44	12 1	10 28	12 1	10 28	12 1					
♄.	25	11 2	2 11	18 8	2 32	19 3	4 3	15 1	4 27	15 7	10 6	12 7	10 28	12 1	11 10	12 1	11 10	12 1					
M.	26	11 53	2 53	19 7	3 13	19 8	4 51	15 6	5 11	15 10	10 49	12 10	11 10	12 1	11 51	12 1	11 51	12 1					
Tu.	27	morn.	2 33	19 7	3 55	19 6	5 32	15 9	5 52	15 9	11 29	12 11	11 51	12 1	0 12	12 1	0 12	12 1					
W.	28	0 45	4 15	19 4	4 34	19 1	6 12	15 8	6 30	15 6	—	—	0 12	12 1	0 52	12 1	0 52	12 1					
Th.	29	1 37	4 52	18 8	5 10	18 3	6 47	15 5	7 4	14 11	0 33	12 7	0 52	12 1	1 30	12 1	1 30	12 1					
F.	30	2 29	5 28	17 10	5 47	17 3	7 20	14 11	7 36	14 3	1 11	12 3	1 30	12 1	2 8	11 1	2 8	11 1					
S.	31	3 19	6 7	16 8	6 25	16 1	7 54	14 3	8 11	13 5	1 48	11 9	2 8	11 1									
Half Mean Spring Range.			9ft. 6in.			7ft. 9in.			6ft. 4in.														
Phases of the Moon.						Moon's Declination at Noon.																	
D. H. M.						M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'			
Last Quarter - 4 7 21 Afternoon.						1	20N.	10	9	4N.	7	17	21S.	5	25	9N.	2						
New - - - - - 12 6 42 Afternoon.						2	21	8	10	0S.	20	18	20	0	26	13	3						
First Quarter - 19 8 6 Afternoon.						3	21	5	11	4	52	19	17	40	27	17							
Full - - - - - 26 5 55 Afternoon.						4	20	3	12	9	17	20	14	17	28	19							
						5	18	8	13	13	20	21	10	3	29	20	4						
						6	15	28	14	16	47	22	5	17	30	21							
In Apogee - - 6 5 0 Morning.						7	12	10	15	19	22	23	0	14	31	20							
In Perigee - - 20 9 0 Afternoon.						8	8	20	16	20	51	24	4N.	47									

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 BREST add 18 m.      DEVONPORT add 17 m.      PORTSMOUTH add 4 m.

## OCTOBER, 1863.

DOVER.					SHEERNESS.					LONDON.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	D		
1 13 18	7	1 32 18	2	2 46 16	2	3 3 15	10	4 18 19	5	4 35 19	1	18.3			
1 52 18	0	2 13 17	10	3 21 15	6	3 40 15	1	4 53 18	8	5 13 18	3	19.3			
2 34 17	7	2 54 15	9	4 1 14	7	4 23 14	1	5 31 17	9	5 53 17	3	20.3			
3 16 15	2	3 39 14	7	4 45 13	8	5 9 13	3	6 15 16	9	6 39 16	3	(			
4 4 14	0	4 34 13	7	5 35 12	11	6 6 12	7	7 6 15	11	7 37 15	6	22.3			
5 8 13	4	5 48 13	4	6 43 12	4	7 24 12	4	8 13 15	3	8 54 15	1	23.3			
6 26 13	6	7 3 13	11	8 10 12	5	8 51 12	8	9 34 15	0	10 14 15	2	24.3			
7 37 14	6	8 7 15	0	9 28 13	0	10 0 13	4	10 54 15	5	11 28 15	8	25.3			
8 31 15	6	8 51 16	1	10 28 13	8	10 50 14	1	11 58 16	1	—	—	26.3			
9 12 16	7	9 31 17	1	11 10 14	6	11 28 14	10	0 20 16	6	0 39 16	11	27.3			
9 50 17	7	10 9 17	11	11 45 15	2	—	—	0 56 17	4	1 15 17	9	28.3			
10 28 18	4	10 47 18	7	0 2 15	6	0 19 15	9	1 33 18	1	1 51 18	5	●			
11 7 18	9	11 25 18	11	0 37 15	11	0 54 16	2	2 7 18	9	2 24 19	0	0.7			
11 45 19	0	—	—	1 11 16	3	1 28 16	4	2 40 19	2	2 57 19	4	1.7			
0 5 19	0	0 26 18	11	1 46 16	4	2 3 16	3	3 16 19	5	3 33 19	5	2.7			
0 47 18	9	1 9 18	6	2 22 16	2	2 39 16	1	3 51 19	4	4 10 19	3	3.7			
1 31 18	3	1 53 17	11	2 58 15	10	3 20 15	7	4 30 19	0	4 51 18	9	4.7			
2 17 17	6	2 41 17	0	3 43 15	3	4 5 14	11	5 14 18	6	5 36 18	1	5.7			
3 8 16	6	3 37 16	0	4 30 14	6	4 59 14	2	6 2 17	9	6 31 17	4	6			
4 6 15	6	4 39 15	1	5 32 13	10	6 7 13	7	7 2 16	11	7 38 16	8	7.7			
5 14 15	0	5 55 15	1	6 48 13	4	7 32 13	5	8 18 16	5	9 3 16	4	8.7			
6 34 15	5	7 12 15	11	8 19 13	8	8 59 14	0	9 46 16	5	10 25 16	7	9.7			
7 45 16	6	8 15 17	1	9 36 14	4	10 6 14	9	11 4 16	10	11 35 17	3	10.7			
8 42 17	7	9 7 18	0	10 34 15	2	10 59 15	6	—	—	0 2 17	8	11.7			
9 31 18	5	9 55 18	9	11 22 15	9	11 44 16	1	0 27 18	1	0 52 18	5	12.7			
10 17 19	0	10 39 19	1	—	—	0 5 16	3	1 15 18	9	1 38 19	0	○			
11 2 19	1	11 24 19	0	0 26 16	5	0 46 16	6	1 58 19	3	2 19 19	4	14.7			
11 46 18	10	—	—	1 6 16	6	1 27 16	5	2 38 19	5	2 57 19	5	15.7			
0 7 18	8	0 27 18	5	1 46 16	3	2 5 16	1	3 15 19	4	3 34 19	2	16.7			
0 48 18	1	1 8 17	10	2 23 15	10	2 40 15	7	3 52 19	0	4 11 18	9	17.7			
1 28 17	5	1 48 17	0	2 58 15	4	3 17 15	0	4 29 18	5	4 46 18	1	18.7			
Mean Spring Range. } 9ft. 4in.					8ft. 0in.					9ft. 7in.					

Mean Spring } 9ft. 4in.  
Range.

8ft. 0in.

9ft. 7in.

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
10 14		9	12 36		17	14 30		25	15 46	
10 33		10	12 52		18	14 42		26	15 53	
10 52		11	13 8		19	14 53		27	15 59	
11 10		12	13 23		20	15 3		28	16 4	
11 28		13	13 37		21	15 13		29	16 8	
11 46		14	13 51		22	15 22		30	16 12	
12 3		15	14 5		23	15 31		31	16 15	
12 20		16	14 17		24	15 39				

as of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.



OCTOBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
Th.	1	2m57	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	
F.	2	3 48	2 2 11 6	2 21 11 3	8 38 20 7	8 57 20 0	5 29 14 0	5 48 14 0												
S.	3	4 39	2 40 11 0	2 59 10 9	9 17 19 4	9 37 18 7	6 8 13 1	6 30 13 1												
	4	5 28	3 19 10 6	3 39 10 3	9 58 17 11	10 20 17 4	6 54 12 2	7 16 12 2												
S.	5	6 16	3 59 9 11	4 22 9 9	10 48 16 8	11 17 16 1	7 41 11 3	8 7 11 3												
M.	6	7 2	4 47 9 6	5 15 9 4	11 51 15 7	—	8 37 10 6	9 13 10 6												
Tu.	7	7 46	5 50 9 3	6 31 9 2	0 28 15 3	1 4 15 1	9 54 10 1	10 37 10 1												
W.	8	8 30	7 18 9 3	7 59 9 5	1 45 15 2	2 23 15 6	11 16 10 4	11 49 10 4												
Th.	9	9 13	8 35 9 7	9 7 9 10	2 57 16 0	3 28 16 8	—	—												
F.	10	9 57	9 35 10 1	9 59 10 4	3 57 17 3	4 19 17 10	0 47 11 6	1 9 11 6												
S.	11	10 41	10 20 10 7	10 39 10 10	4 39 18 5	4 56 19 0	1 29 12 5	1 50 12 5												
S.	12	11 27	10 56 11 1	11 15 11 3	5 13 19 6	5 30 19 10	2 9 13 2	2 27 13 2												
M.	13	12 16	11 32 11 5	11 50 11 7	5 48 20 3	6 7 20 7	2 44 13 9	3 0 13 9												
Tu.	14	1 8	—	0 7 11 8	6 24 20 10	6 42 21 0	3 17 14 3	3 35 14 3												
W.	15	2 3	0 24 11 8	0 40 11 9	6 58 21 2	7 17 21 3	3 51 14 7	4 8 14 7												
Th.	16	2 59	1 37 11 6	1 56 11 5	7 37 21 2	7 55 21 1	4 26 14 8	4 45 14 8												
F.	17	3 57	2 16 11 3	2 38 11 1	8 14 20 11	8 33 20 7	5 4 14 3	5 24 14 3												
S.	18	4 55	2 16 11 3	2 38 11 1	8 56 20 1	9 18 19 8	5 47 13 8	6 10 13 8												
S.	19	5 52	3 0 10 11	3 22 10 9	9 40 19 1	10 6 18 7	6 35 13 0	7 2 13 0												
M.	20	6 47	3 46 10 6	4 13 10 4	10 38 18 1	11 13 17 7	7 31 12 3	8 4 12 3												
Tu.	21	7 40	4 45 10 1	5 17 10 0	11 52 17 2	—	8 39 11 7	9 19 11 7												
W.	22	8 31	5 55 9 11	6 39 9 11	0 32 16 10	1 12 16 10	10 11 11 5	10 45 11 5												
Th.	23	9 21	7 27 10 1	8 7 10 3	1 52 17 1	2 29 17 7	11 23 11 10	11 56 11 10												
F.	24	10 12	8 43 10 6	9 13 10 9	3 4 18 3	3 35 18 10	—	—												
S.	25	11 2	9 43 11 1	10 10 11 3	4 3 19 6	4 28 20 0	0 53 13 1	1 20 13 1												
S.	26	11 53	10 33 11 6	10 55 11 8	4 50 20 6	5 12 20 10	1 45 13 10	2 8 13 10												
M.	27	morn.	11 18 11 10	11 39 11 11	5 34 21 1	5 56 21 3	2 30 14 5	2 51 14 5												
Tu.	28	0 45	12 0 11 11	—	6 17 21 4	6 37 21 4	3 10 14 8	3 29 14 8												
W.	29	1 37	0 19 11 10	0 39 11 9	6 58 21 3	7 19 21 1	3 50 14 8	4 9 14 8												
Th.	30	2 29	1 0 11 8	1 20 11 6	7 39 20 10	7 56 20 7	4 28 14 5	4 46 14 5												
F.	31	3 19	1 38 11 4	1 57 11 1	8 15 20 2	8 33 19 9	5 5 13 9	5 24 13 9												
S.	31	3 19	2 16 10 11	2 35 10 8	8 53 19 2	9 13 18 7	5 44 13 0	6 5 13 0												
Half Mean Spring Range.			5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.					
Phases of the Moon.										Moon's Declination at Noon.										
D. H. M.										M.D. ° ' M.D. ° ' M.D. ° ' M.D. °										
Last Quarter - 4 7 21 Afternoon.										1 20 N. 10 9 4 N. 7 17 21 S. 5 25 9										
New - - - - 12 6 42 Afternoon.										2 21 8 10 0 S. 20 18 20 0 26 13										
First Quarter 19 8 6 Afternoon.										3 21 5 11 4 52 19 17 40 27 17										
Full - - - - 26 5 55 Afternoon.										4 20 3 12 9 17 20 14 17 28 19										
										5 18 8 13 13 20 21 10 3 29 20										
In Apogee - - 6 5 0 Morning.										6 15 28 14 16 47 22 5 17 30 21										
In Perigee - - 20 9 0 Afternoon.										7 12 10 15 19 22 23 0 14 31 20										
										8 8 20 16 20 51 24 4 N. 47										

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, HARWICH subtract 5 m. HULL add 1 m. SUNDERLAND add 5 m.

## OCTOBER, 1863.

NORTH SHIELDS.						LEITH,						THURSO.						C's AGE AT NOON.					
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.							
H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	D.						
5 33 12 10			5 52 12 5			4 27 15 10			4 46 15 5			10 37 12 4			10 58 11 9		18.3						
6 12 12 0			6 33 11 7			5 6 14 11			5 28 14 5			11 20 11 3			11 44 10 9		19.3						
6 55 11 1			7 19 10 7			5 52 13 11			6 15 13 4			— —			0 7 10 2		20.3						
7 46 10 1			8 14 9 7			6 40 12 10			7 9 12 4			0 32 9 8			0 59 9 3		(						
8 47 9 3			9 26 9 1			7 41 12 0			8 18 11 9			1 32 8 11			2 10 8 8		22.3						
10 6 9 1			10 49 9 2			9 0 11 7			9 44 11 8			2 53 8 6			3 42 8 7		23.3						
11 29 9 5			— —			10 22 11 11			10 56 12 2			4 22 8 8			4 58 8 10		24.3						
0 3 9 8			0 33 10 0			11 26 12 7			11 54 13 0			5 28 9 3			5 55 9 8		25.3						
0 59 10 5			1 20 10 9			— —			0 14 13 5			6 16 10 2			6 33 10 9		26.3						
1 38 11 2			1 56 11 7			0 32 13 11			0 50 14 5			6 48 11 3			7 3 11 10		27.3						
1 2 12 12 0			2 29 12 4			1 7 14 11			1 25 15 4			7 18 12 3			7 32 12 8		28.3						
2 45 12 8			3 1 12 11			1 42 15 9			1 59 16 1			7 47 13 1			8 4 13 4		●						
3 17 13 2			3 35 13 4			2 16 16 4			2 33 16 6			8 21 13 5			8 36 13 6		0.7						
3 51 13 6			4 9 13 6			2 48 16 7			3 5 16 7			8 54 13 6			9 13 13 5		1.7						
4 28 13 4			4 47 13 2			3 24 16 5			3 43 16 3			9 33 13 3			9 52 13 1		2.7						
5 7 13 0			5 28 12 9			4 2 16 1			4 23 15 10			10 13 12 9			10 36 12 5		3.7						
5 50 12 6			6 13 12 3			4 45 15 6			5 8 15 2			11 0 12 0			11 25 11 8		4.7						
6 37 11 11			7 3 11 7			5 33 14 10			6 0 14 5			11 51 11 3			— —		5.7						
7 35 11 1			8 10 10 8			6 30 13 11			7 5 13 6			0 22 10 9			0 56 10 5		6.7						
8 48 10 5			9 31 10 3			7 42 13 2			8 23 13 0			1 33 10 2			2 15 9 11		7.7						
10 14 10 4			10 57 10 7			9 7 13 0			9 52 13 2			3 2 9 11			3 50 10 0		8.7						
11 36 10 11			— —			10 29 13 6			11 3 13 10			4 30 10 3			5 5 10 6		9.7						
0 10 11 3			0 37 11 7			11 32 14 3			11 58 14 9			5 33 10 11			6 0 11 6		10.7						
1 4 11 11			1 27 12 4			— —			0 21 15 3			6 22 12 0			6 42 12 6		11.7						
1 50 12 8			2 11 13 0			0 44 15 8			1 6 16 1			7 1 12 11			7 19 13 4		12.7						
2 31 13 3			2 51 13 5			1 28 16 5			1 49 16 7			7 38 13 7			7 57 13 9		13.7						
3 10 13 7			3 30 13 7			2 9 16 9			2 28 16 9			8 16 13 8			8 35 13 7		14.7						
3 50 13 6			4 10 13 4			2 47 16 7			3 6 16 5			8 54 13 5			9 14 13 2		15.7						
4 30 13 1			4 49 12 10			3 26 16 2			3 44 15 10			9 34 12 10			9 53 12 6		16.7						
5 8 12 6			5 28 12 3			4 3 15 6			4 22 15 2			10 13 12 2			10 33 11 8		17.7						
5 48 11 11			6 8 11 6			4 42 14 10			5 3 14 5			10 54 11 3			11 15 10 10		18.7						
Mean Spring Range.						6ft. 8in.						8ft. 2in.						6ft. 7in.					

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
10 14		9	12 36		17	14 30		25	15 46	
10 33		10	12 52		18	14 42		26	15 53	
10 52		11	13 8		19	14 53		27	15 59	
11 10		12	13 23		20	15 3		28	16 4	
11 28		13	13 37		21	15 13		29	16 8	
11 46		14	13 51		22	15 22		30	16 12	
12 3		15	14 5		23	15 31		31	16 15	
12 20		16	14 17		24	15 39				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

NORTH SHIELDS add 6 m.

LEITH add 13 m.

THURSO add 10 m.

## TIDE TABLES FOR THE

OCTOBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
Th.	1	2m 57	2 0	9 9	2 18	9 7	1 11	25 7	1 29	24 10	8 20	20 1	8 39	19 4						
F.	2	3 48	2 37	9 4	2 56	9 2	1 47	24 0	2 7	23 2	8 58	18 7	9 17	17 10						
S.	3	4 39	3 16	8 11	3 36	8 9	2 26	22 4	2 47	21 6	9 37	17 1	9 57	16 4						
Sp.	4	5 28	3 59	8 6	4 22	8 4	3 10	20 7	3 35	19 10	10 17	15 7	10 40	14 11						
M.	5	6 16	4 50	8 2	5 24	8 0	4 5	19 2	4 42	18 8	11 10	14 5	11 44	14 2						
Tu.	6	7 2	6 1	7 10	6 44	7 9	5 24	18 6	6 14	18 8	—	—	0 25	14 2						
W.	7	7 46	7 25	7 10	8 2	8 0	6 54	19 0	7 31	19 6	1 9	14 4	1 50	14 9						
Th.	8	8 30	8 35	8 2	9 4	8 5	8 32	0 3	8 31	21 0	2 26	15 5	2 58	16 1						
F.	9	9 13	9 29	8 7	9 50	8 9	8 53	21 9	9 12	22 6	3 24	16 10	3 47	17 7						
S.	10	9 57	10 10	8 11	10 28	9 1	9 30	23 3	9 47	23 11	4 9	18 3	4 30	18 11						
Sp.	11	10 41	10 47	9 3	11 6	9 4	10 32	24 6	10 20	25 0	4 50	19 6	5 10	20 0						
M.	12	11 27	11 25	9 6	11 43	9 7	10 38	25 5	10 56	25 10	5 30	20 5	5 48	20 10						
Tu.	13	on 16	—	—	0 2	9 9	11 15	26 1	11 31	26 4	6 6	21 1	6 22	21 4						
W.	14	1 8	0 19	9 10	0 38	9 10	11 49	26 5	—	—	6 40	21 5	6 59	21 5						
Th.	15	2 3	0 58	9 10	1 17	9 10	0 8	26 5	0 28	26 3	7 17	21 3	7 36	21 0						
F.	16	2 59	1 36	9 9	1 55	9 9	0 47	26 0	1 6	25 7	7 56	20 8	8 18	20 3						
S.	17	3 57	2 17	9 8	2 38	9 6	1 26	25 0	1 48	24 5	8 39	19 9	9 1	19 2						
Sp.	18	4 55	2 59	9 4	3 23	9 2	2 10	23 10	2 33	23 2	9 24	18 7	9 49	18 0						
M.	19	5 52	3 51	9 0	4 21	8 10	3 22	26 6	3 32	21 9	10 16	17 4	10 43	16 9						
Tu.	20	6 47	4 52	8 8	5 29	8 6	4 7	21 2	4 47	20 9	11 15	16 3	11 51	16 2						
W.	21	7 40	6 8	8 5	6 53	8 5	5 32	20 9	6 22	21 1	—	—	0 34	16 4						
Th.	22	8 31	7 33	8 7	8 11	8 9	7 32	18	7 39	22 4	1 19	16 8	2 1	17 3						
F.	23	9 21	8 42	9 0	9 13	9 2	8 9	23 1	8 37	23 10	2 36	17 11	3 8	18 9						
S.	24	10 12	9 40	9 4	10 4	9 6	9 12	24 7	9 23	25 2	3 38	19 5	4 4	20 0						
Sp.	25	11 2	10 28	9 7	10 52	9 8	9 45	25 8	10 6	26 1	4 30	20 7	4 56	21 0						
M.	26	11 53	11 14	9 9	11 36	9 10	10 27	26 4	10 48	26 6	5 19	21 3	5 40	21 5						
Tu.	27	morn.	11 57	9 10	—	—	11 9	26 6	11 30	26 5	6 12	21 5	6 21	21 5						
W.	28	0 45	0 18	9 10	0 39	9 10	11 50	26 3	—	—	6 41	21 3	7 1	21 0						
Th.	29	1 37	1 0	9 9	1 18	9 8	0 10	26 0	0 29	25 7	7 19	20 7	7 37	20 2						
F.	30	2 29	1 36	9 7	1 55	9 5	0 47	25 1	1 6	24 7	7 56	19 9	8 15	19 2						
S.	31	3 19	2 14	9 3	2 32	9 1	1 24	23 10	1 43	23 2	8 34	18 7	8 52	18 0						
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.					
Phases of the Moon.							Moon's Declination at Noon.													
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'		
Last Quarter - 4 7 21 Afternoon.							1	20	N. 10	9	4	N. 7	17	21	S. 5	25	9	N. 29		
New - - - - 12 6 42 Afternoon.							2	21	8	10	0	S. 20	18	20	0	26	13	38		
First Quarter 19 8 6 Afternoon.							3	21	5	11	4	52	19	17	40	27	17	0		
Full - - - - 26 5 55 Afternoon.							4	20	3	12	9	17	20	14	17	28	19	25		
							5	18	8	13	13	20	21	10	3	29	20	47		
							6	15	28	14	16	47	22	5	17	30	21	5		
In Apogee - - 6 5 0 Morning.							7	12	10	15	19	22	23	0	14	31	20	22		
In Perigee - - 20 9 0 Afternoon.							8	8	20	16	20	51	24	4	N. 47					

\*The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

OCTOBER, 1863.

M. S. P. I.	WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age at Noon.
	MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
	Time. H. M. P. I.	Height. F. I.	Time. H. M. P. I.	Height. F. I.	Time. H. M. P. I.	Height. F. I.	Time. H. M. P. I.	Height. F. I.	Time. H. M. P. I.	Height. F. I.	Time. H. M. P. I.	Height. F. I.	
1	8 59 36	2	9 16 35	0	—	—	0 19 15	3	1 2 10	8	1 21 10	5	18.3
2	9 33 33	9	9 50 32	7	0 40 14	9	1 2 14	3	1 41 10	1	2 2 9	10	19.3
3	10 6 31	3	10 24 31	0	1 25 13	9	1 48 13	3	2 25 9	7	2 47 9	3	20.3
4	10 44 28	9	11 10 27	8	2 13 12	9	2 40 12	4	3 12 9	0	3 39 8	9	21.3
5	11 44 26	11	—	—	3 13 12	0	3 51 11	9	4 11 8	6	4 47 8	4	22.3
6	0 20 26	5	1 4 26	6	4 33 11	8	5 17 11	9	5 24 8	4	6 6 8	8	23.3
7	1 46 26	10	2 24 27	5	5 56 12	0	6 30 12	3	6 43 8	7	7 17 8	9	24.3
8	2 59 28	4	3 32 29	4	7 0 12	8	7 27 13	1	7 48 9	0	8 17 9	3	25.3
9	4 1 30	5	4 25 31	7	7 49 13	6	8 8 13	11	8 41 9	6	9 2 9	9	26.3
0	4 49 32	8	5 11 33	10	8 26 14	4	8 42 14	9	9 23 9	11	9 41 10	2	27.3
1	5 31 34	9	5 51 35	7	8 58 15	2	9 15 15	5	9 58 10	5	10 13 10	7	28.3
2	6 11 36	3	6 30 36	10	9 32 15	9	9 49 15	11	10 29 10	9	10 45 10	11	29.3
3	6 48 37	3	7 6 37	9	10 6 16	1	10 20 16	3	11 2 11	0	11 18 11	1	30.3
4	7 24 37	11	7 42 37	10	10 37 16	3	10 54 16	2	11 37 11	1	11 57 11	0	31.3
5	8 0 37	9	8 18 37	5	11 13 16	1	11 33 15	11	—	—	0 17 10	11	32.3
6	8 37 37	0	8 57 36	5	11 54 15	8	—	—	0 36 10	10	0 57 10	8	33.3
7	9 17 35	8	9 36 34	9	0 17 15	5	0 42 15	0	1 19 10	6	1 42 10	3	34.3
8	9 55 33	9	10 18 32	8	1 7 14	8	1 33 14	3	2 7 10	1	2 33 9	10	35.3
9	10 44 31	7	11 13 30	7	2 3 13	10	2 37 13	6	3 2 9	7	3 35 9	5	36.3
0	11 48 29	11	—	—	3 14 13	2	3 56 13	0	4 12 9	2	4 51 9	1	37.3
1	0 27 29	9	1 13 30	0	4 40 13	1	5 25 13	3	5 31 9	1	6 13 9	3	38.3
2	1 54 30	6	2 33 31	4	6 3 13	7	6 37 13	11	6 50 9	5	7 24 9	8	39.3
3	3 10 32	4	3 45 33	5	7 5 14	4	7 33 14	9	7 55 9	11	8 25 10	2	40.3
4	4 16 34	7	4 45 35	7	7 57 15	2	8 20 15	6	8 53 10	5	9 18 10	7	41.3
5	5 11 36	5	5 37 37	2	8 40 15	10	9 1 16	1	9 40 10	9	10 0 10	11	42.3
6	6 0 37	7	6 22 37	9	9 22 16	3	9 42 16	4	10 19 11	1	10 38 11	2	43.3
7	6 44 37	10	7 5 37	11	10 1 16	4	10 19 16	3	10 58 11	2	11 18 11	1	44.3
8	7 25 37	8	7 44 37	3	10 37 16	2	10 56 15	11	11 38 11	0	11 59 10	11	45.3
9	8 2 36	9	8 19 36	2	11 15 15	8	11 34 15	5	—	—	0 18 10	9	46.3
0	8 37 35	6	8 54 34	8	11 54 15	1	—	—	0 37 10	6	0 57 10	4	47.3
1	9 11 33	9	9 27 32	10	0 15 14	8	0 36 14	3	1 17 10	1	1 37 9	10	48.3
{ Mean Spring Range.				18ft. 7in.	{ 8ft. 0in.				{ 5ft. 6in.				

Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
10 14		9	12 36		17	14 30		25	15 46	
10 33		10	12 52		18	14 42		26	15 53	
10 52		11	13 8		19	14 53		27	15 59	
11 10		12	13 23		20	15 3		28	16 4	
11 28		13	13 37		21	15 13		29	16 8	
11 46		14	13 51		22	15 22		30	16 12	
12 3		15	14 5		23	15 31		31	16 15	
12 20		16	14 17		24	15 39				

use of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 15 m. | HOLYHEAD add 15 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## OCTOBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.						
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
Th.	1	H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.		
F.	2	2m57	0 38	9 4	0 57	9 3	10 0	7 1	10 19	6 10	7 24	10 4	7 43	9 1							
S.	3	3 48	1 19	9 1	1 42	8 10	10 40	6 6	11 7	6 2	8 3	9 6	8 26	9 1							
	4	4 39	2 0	8 8	2 30	8 5	11 35	5 10	—	—	8 50	8 9	9 19	8 1							
♄.	5	5 28	2 55	8 3	3 22	8 1	0 8	5 6	0 42	5 3	9 48	8 0	10 22	7 1							
M.	6	6 16	3 52	7 11	4 29	7 10	1 20	5 2	2 3	5 11	11 0	7 8	11 39	7 1							
Tu.	7	7 2	5 6	7 9	5 47	7 9	2 43	5 2	3 25	5 5	—	—	0 21	7 1							
W.	8	7 46	6 27	7 9	7 3	7 10	4 0	5 7	4 29	5 9	1 1	7 10	1 36	8 1							
Th.	9	8 30	7 34	7 11	8 2	8 2	4 55	6 0	5 17	6 3	2 7	8 4	2 34	8 1							
F.	10	9 13	8 23	8 4	8 42	8 7	5 35	6 5	5 52	6 8	2 54	9 1	3 12	9 1							
S.	11	9 57	9 0	8 10	9 17	9 0	6 10	6 10	6 27	7 1	3 28	9 9	3 44	10 1							
♄.	12	10 41	9 34	9 2	9 51	9 3	6 46	7 3	7 3	7 5	4 0	10 5	4 17	10 1							
M.	13	11 27	10 8	9 5	10 25	9 6	7 22	7 7	7 39	7 8	4 35	11 0	4 52	11 1							
Tu.	14	0a16	10 42	9 6	10 58	9 7	7 56	7 9	8 11	7 10	5 12	11 4	5 28	11 1							
W.	15	1 8	11 15	9 7	11 33	9 6	8 27	7 10	8 44	7 9	5 45	11 5	6 2	11 1							
Th.	16	2 3	11 52	9 6	—	—	9 2	7 8	9 19	7 6	6 21	11 3	6 41	11 1							
F.	17	2 59	0 12	9 5	0 33	9 4	9 38	7 4	9 59	7 2	7 1	10 9	7 22	10 1							
S.	18	3 57	0 56	9 3	1 21	9 2	10 21	7 0	10 45	6 9	7 44	10 1	8 8	9 1							
♄.	19	4 55	1 47	9 0	2 15	8 10	11 16	6 5	11 54	6 2	8 34	9 6	9 7	9 1							
M.	20	5 52	2 46	8 8	3 19	8 6	—	—	0 36	5 11	9 44	8 11	10 23	8 1							
Tu.	21	6 47	3 54	8 4	4 34	8 3	1 20	5 10	2 8	5 10	11 5	8 7	11 47	8 1							
W.	22	7 40	5 14	8 3	5 55	8 3	2 50	6 0	3 31	6 3	—	—	0 29	8 1							
Th.	23	8 31	6 35	8 4	7 11	8 5	4 5	6 6	4 33	6 9	1 8	9 0	1 43	9 1							
F.	24	9 21	7 40	8 7	8 7	8 10	4 56	6 11	5 19	7 1	2 12	9 7	2 38	10 1							
S.	25	10 12	8 31	9 1	8 54	9 3	5 41	7 4	6 4	7 6	3 1	10 4	3 22	10 1							
♄.	26	11 2	9 16	9 5	9 37	9 6	6 26	7 8	6 49	7 9	3 42	10 11	4 3	11 1							
M.	27	11 53	9 58	9 7	10 17	9 8	7 11	7 10	7 32	7 11	4 24	11 4	4 45	11 1							
Tu.	28	morn.	10 37	9 7	10 56	9 7	7 51	7 11	8 10	7 11	5 6	11 6	5 27	11 1							
W.	29	0 45	11 15	9 6	11 34	9 5	8 28	7 10	8 46	7 8	5 46	11 4	6 4	11 1							
Th.	30	1 37	11 53	9 4	—	—	9 3	7 5	9 20	7 3	6 23	10 11	6 42	10 1							
F.	31	2 29	0 13	9 3	0 33	9 1	9 38	7 0	9 56	6 9	7 1	10 3	7 20	9 1							
S.	31	3 19	0 53	9 0	1 15	8 10	10 15	6 6	10 35	6 3	7 39	9 6	7 59	9 1							
Half Mean Spring } Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.						
Phases of the Moon.							Moon's Declination at Noon.														
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°				
Last Quarter-							4	7	21	Afternoon.	1	20N.	10	9	4N.	7	17	21S.	5	25	9N.2
New - - - - -							12	6	42	Afternoon.	2	21	8	10	0S.20	18	20	0	26	13	3
First Quarter							19	8	6	Afternoon.	3	21	5	11	4	52	19	17	40	27	17
Full - - - - -							26	5	55	Afternoon.	4	20	3	12	9	17	20	14	17	28	19
											5	18	8	13	13	20	21	10	3	29	20
											6	15	28	14	16	47	22	5	17	30	21
In Apogee - -							6	5	0	Morning.	7	12	10	15	19	22	23	0	14	31	20
In Perigee - -							20	9	0	Afternoon.	8	8	20	16	20	51	24	4N.47			

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—  
 BELFAST subtract 2 m | LONDONDERRY add 4 m. | SLIGO BAY add 9 m.

OCTOBER, 1863.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age At Noon.
Morning.		Afternoon.			Morning.		Afternoon.			Morning.		Afternoon.			
Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.		
6 46 14 1	7 6 13 6	7 11 11 3	7 30 10 11	7 32 12 2	7 49 11 10	18.3									
7 27 12 11	7 50 12 4	7 49 10 6	8 7 10 2	8 7 11 6	8 25 11 2	19.3									
8 12 11 9	8 36 11 1	8 27 9 9	8 48 9 5	8 43 10 9	9 3 10 5	20.3									
9 11 10 6	9 31 10 2	9 9 9 1	9 34 8 9	9 25 10 1	9 54 9 9	(									
10 8 9 11	10 48 9 10	10 8 8 7	10 46 8 5	10 30 9 5	11 6 9 3	22.3									
11 33 9 11	—	11 30 8 5	—	11 47 9 2	—	23.3									
0 13 10 1	0 48 10 5	0 11 8 7	0 48 8 9	0 24 9 3	0 59 9 6	24.3									
1 18 10 10	1 45 11 4	1 23 9 0	1 54 9 4	1 31 9 9	2 3 10 1	25.3									
2 6 11 10	2 26 12 4	2 20 9 8	2 42 10 0	2 31 10 5	2 55 10 9	26.3									
2 45 12 9	3 3 13 3	3 3 10 4	3 22 10 8	3 18 11 1	3 40 11 5	27.3									
3 20 13 7	3 37 14 0	3 41 11 0	4 0 11 3	4 1 11 9	4 21 12 0	28.3									
3 55 14 4	4 12 14 7	4 18 11 6	4 36 11 8	4 40 12 2	4 58 12 4	●									
4 29 14 10	4 45 15 1	4 55 11 10	5 12 11 11	5 16 12 5	5 32 12 7	0.7									
5 4 15 2	5 23 15 1	5 31 12 0	5 50 12 0	5 51 12 8	6 10 12 8	1.7									
5 43 15 0	6 2 14 9	6 9 11 11	6 28 11 9	6 30 12 7	6 49 12 6	2.7									
6 22 14 6	6 44 14 2	6 48 11 7	7 9 11 4	7 9 12 5	7 30 12 3	3.7									
7 7 13 10	7 32 13 5	7 31 11 1	7 52 10 10	7 50 12 1	8 10 11 10	4.7									
7 58 12 11	8 27 12 4	8 14 10 6	8 40 10 2	8 32 11 6	8 56 11 3	5.7									
8 59 11 10	9 33 11 6	9 8 9 11	9 37 9 8	9 23 10 11	9 56 10 7	6									
10 13 11 3	10 55 11 4	10 13 9 6	10 53 9 5	10 34 10 4	11 13 10 3	7.7									
11 4 11 6	—	11 39 9 6	—	11 54 10 3	—	8.7									
0 20 11 10	0 55 12 3	0 19 9 9	0 57 10 0	0 31 10 5	1 7 10 8	9.7									
1 23 12 9	1 50 13 3	1 32 10 3	2 4 10 7	1 41 11 0	2 15 11 5	10.7									
2 15 13 8	2 40 14 1	2 32 10 11	2 58 11 3	2 46 11 9	3 14 12 0	11.7									
3 2 14 5	3 23 14 9	3 22 11 6	3 46 11 9	3 40 12 3	4 6 12 6	12.7									
3 44 14 11	4 5 15 1	4 7 11 10	4 28 11 11	4 30 12 7	4 51 12 7	○									
4 25 15 2	4 44 15 2	4 49 12 0	5 11 11 11	5 11 12 7	5 31 12 7	14.7									
5 4 15 0	5 24 14 10	5 32 11 10	5 52 11 9	5 52 12 6	6 12 12 5	15.7									
5 44 14 6	6 3 14 2	6 11 11 7	6 29 11 4	6 31 12 3	6 50 12 1	16.7									
6 22 13 10	6 42 13 4	6 48 11 1	7 6 10 10	7 9 11 11	7 27 11 9	17.7									
7 2 12 11	7 22 12 6	7 25 10 6	7 43 10 3	7 45 11 6	8 2 11 3	18.7									
Mean Spring Range } 7ft. 5in.					5ft. 10in.					6ft. 2in.					

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
10 14		9	12 36		17	14 30		25	15 46	
10 33		10	12 52		18	14 42		26	15 53	
10 52		11	13 8		19	14 53		27	15 59	
11 10		12	13 23		20	15 3		28	16 4	
11 28		13	13 37		21	15 13		29	16 8	
11 46		14	13 51		22	15 22		30	16 12	
12 3		15	14 5		23	15 31		31	16 15	
12 20		16	14 17		24	15 39				

s of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

NOVEMBER, 1863.																										
WEEK DAY.		MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.										
				MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.							
				Time.		Height.						Time.		Height.						Time.		Height.				
				H. M.	F. I.	H. M.	F. I.					H. M.	F. I.	H. M.	F. I.					H. M.	F. I.	H. M.	F. I.			
S.	1	4m 8	6 46	15	5	7 7	14	9	8 27	13	7	8 46	12	7	2 27	11	3	2 47	11	3	2 47	11	3	2 47	11	3
M.	2	4 55	7 29	14	2	7 54	13	7	9 6	12	10	9 28	11	9	3 7	10	8	3 27	11	9	3 27	11	9	3 27	11	9
Tu.	3	5 40	8 22	13	3	8 56	12	11	9 52	12	2	10 21	11	3	3 51	10	2	4 18	11	3	4 18	11	3	4 18	11	3
W.	4	6 24	9 31	12	10	10 8	13	0	10 52	11	10	11 30	11	2	4 50	9	8	5 24	11	2	5 24	11	2	5 24	11	2
Th.	5	7 6	10 47	13	2	11 22	13	6	—	—	—	1 30	12	0	5 59	9	7	6 36	12	0	6 36	12	0	6 36	12	0
F.	6	7 49	11 54	13	11	—	—	—	0 45	11	8	1 19	12	7	7 9	9	11	7 41	12	7	7 41	12	7	7 41	12	7
S.	7	8 33	0 22	14	6	0 49	15	1	1 53	12	5	2 23	13	4	8 11	10	6	8 40	13	4	8 40	13	4	8 40	13	4
S.	8	9 18	1 14	15	9	1 34	16	5	2 49	13	4	3 16	14	2	9 5	11	2	9 28	14	2	9 28	14	2	9 28	14	2
M.	9	10 6	1 54	17	1	2 12	17	8	3 40	14	2	4 3	14	7	9 49	11	10	10 8	14	7	9 49	11	10	10 8	14	7
Tu.	10	10 57	2 31	18	3	2 52	18	9	4 25	14	10	4 46	15	1	10 27	12	4	10 49	15	1	10 27	12	4	10 49	15	1
W.	11	11 52	3 13	19	5	3 32	19	3	5 7	15	4	5 27	15	5	11 9	12	8	11 27	15	5	11 9	12	8	11 27	15	5
Th.	12	0 49	3 53	19	5	4 15	19	6	5 48	15	7	6 9	15	7	11 49	12	10	—	15	7	11 49	12	10	—	15	7
F.	13	1 49	4 35	19	6	4 56	19	4	6 32	15	10	6 50	15	5	0 12	12	10	0 35	15	5	0 12	12	10	0 35	15	5
S.	14	2 49	5 18	19	1	5 40	18	9	7 12	15	9	7 33	15	2	0 56	12	9	1 19	15	2	0 56	12	9	1 19	15	2
S.	15	3 47	6 4	18	5	6 29	17	10	7 56	15	5	8 18	14	8	1 41	12	6	2 5	15	5	8 18	14	8	2 5	15	5
M.	16	4 43	6 55	17	3	7 23	16	7	8 43	15	0	9 9	14	0	2 30	12	1	2 56	15	0	9 9	14	0	2 30	12	1
Tu.	17	5 37	7 52	16	3	8 24	15	6	9 36	14	3	10 3	13	2	3 23	11	7	3 50	14	3	10 3	13	2	3 23	11	7
W.	18	6 28	9 5	15	2	9 32	15	0	10 35	13	8	11 8	12	9	4 21	11	1	4 51	13	8	11 8	12	9	4 21	11	1
Th.	19	7 18	10 11	15	0	10 49	15	2	11 45	13	4	—	—	—	5 26	10	8	6 2	13	4	—	—	—	5 26	10	8
F.	20	8 7	11 27	15	4	—	—	—	0 25	12	9	1 3	13	7	6 37	10	8	7 14	12	9	1 3	13	7	6 37	10	8
S.	21	8 56	0 2	15	8	0 32	16	1	1 40	13	5	2 14	14	0	7 50	11	1	8 23	13	5	2 14	14	0	7 50	11	1
S.	22	9 45	1 1	16	6	1 27	16	11	2 44	14	0	3 12	14	5	8 52	11	7	9 21	14	0	3 12	14	5	8 52	11	7
M.	23	10 36	1 52	17	5	2 15	17	9	3 39	14	6	4 4	14	8	9 47	12	0	10 11	14	6	4 4	14	8	9 47	12	0
Tu.	24	11 28	2 36	18	1	2 56	18	4	4 28	14	10	4 49	15	0	10 31	12	2	10 52	14	10	4 49	15	0	10 31	12	2
W.	25	morn.	3 18	18	5	3 38	18	5	5 10	15	2	5 31	15	0	11 14	12	3	11 34	15	2	5 31	15	0	11 14	12	3
Th.	26	0 19	3 59	18	3	4 18	18	2	5 51	15	3	6 10	14	11	11 55	12	3	—	15	3	6 10	14	11	11 55	12	3
F.	27	1 10	4 35	18	0	4 52	17	9	6 30	15	2	6 45	14	7	0 15	12	2	0 34	17	9	6 45	14	7	0 15	12	2
S.	28	2 0	5 10	17	6	5 27	17	3	7 2	14	11	7 17	14	2	0 53	11	11	1 11	17	3	7 2	14	11	7 17	14	2
S.	29	2 48	5 45	16	11	6 4	16	7	7 33	14	6	7 51	13	6	1 29	11	9	1 46	16	11	7 33	14	6	7 51	13	6
M.	30	3 34	6 22	16	2	6 41	15	9	8 7	13	11	8 24	12	11	2 5	11	5	2 24	15	9	8 7	13	11	8 24	12	11
Half Mean Spring Range.				9ft. 6in.						7ft. 9in.						6ft. 4 in.										
Phases of the Moon.												Moon's Declination at Noon.														
D. H. M.												M.D. ° ' "														
Last Quarter - 3 3 34 Afternoon.												1 18 N.44 9 11 S.55 17 10 S.59 25 2														
New - - - - 11 7 59 Morning.												2 16 18 10 15 38 18 6 20 26 2														
First Quarter 18 3 5 Morning.												3 13 13 11 18 35 19 1 25 27 2														
Full - - - - 25 9 1 Morning.												4 9 35 12 20 28 20 3 N.31 28 1														
												5 5 32 13 21 5 21 8 13 29 1														
In Apogee - - 3 1 0 Morning.												6 1 13 14 20 20 22 12 27 30 1														
In Perigee - - 15 1 0 Morning.												7 38.16 15 18 15 23 16 1														
In Apogee - - 30 10 0 Afternoon.												8 7 42 16 15 3 24 18 43														

The times of High Water are given for Mean Time at Place ; if Greenwich or Railway Time be required  
BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4



## NOVEMBER, 1863.

DOVER.				SHEERNESS.				LONDON.				C's Age at Noon.	
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.			
Time. L. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	D.	
2 7 16 6		2 28 16 1		3 36 14 8		3 55 14 3		5 6 17 9		5 26 17 5		19.7	
2 48 15 7		3 8 15 2		4 16 13 11		4 38 13 7		5 46 17 0		6 9 16 8		20.7	
3 32 14 8		3 57 14 3		5 1 13 3		5 28 12 11		6 31 16 3		6 56 15 11		21.7	
4 27 13 11		4 58 13 9		5 58 12 9		6 35 12 6		7 27 15 8		8 1 15 6		22.7	
5 29 13 9		6 2 13 11		7 12 12 7		7 50 12 8		8 39 15 5		9 16 15 5		23.7	
6 35 14 3		7 7 14 8		8 28 12 10		9 0 13 2		9 52 15 6		10 26 15 8		24.7	
7 37 15 2		8 5 15 8		9 31 13 6		9 59 13 10		10 58 15 11		11 27 16 3		25.7	
8 29 16 2		8 51 16 8		10 24 14 2		10 48 14 6		11 53 16 7		—		26.7	
9 12 17 2		9 32 17 7		11 8 14 10		11 27 15 2		0 17 17 0		0 37 17 4		27.7	
9 54 18 0		10 17 18 4		11 45 15 6		—		0 58 17 9		1 17 18 1		28.7	
0 37 18 7		10 59 18 9		0 4 15 9		0 25 16 0		1 36 18 5		1 56 18 9		29.7	
1 22 18 11		11 46 19 0		0 46 16 2		1 5 16 3		2 16 19 0		2 35 19 2		30.7	
—		0 9 19 0		1 25 16 4		1 47 16 4		2 54 19 4		3 15 19 5		31.7	
0 32 19 0		0 56 18 10		2 7 16 3		2 27 16 2		3 34 19 6		3 56 19 5		32.7	
1 20 18 7		1 45 18 4		2 48 16 1		3 10 15 10		4 18 19 3		4 41 19 0		33.7	
2 11 18 0		2 37 17 6		3 34 15 7		3 59 15 3		5 4 18 9		5 29 18 6		34.7	
3 4 17 1		3 31 16 8		4 26 14 11		4 54 14 7		5 56 18 2		6 25 17 9		35.7	
4 0 16 2		4 28 15 9		5 24 14 4		5 59 14 0		6 55 17 5		7 27 17 2		36.7	
5 0 15 6		5 32 15 5		6 34 13 9		7 13 13 9		8 2 16 11		8 40 16 9		37.7	
6 4 15 6		6 40 15 9		7 53 13 10		8 29 14 0		9 17 16 8		9 55 16 8		38.7	
7 16 16 1		7 48 16 6		9 5 14 3		9 39 14 6		10 31 16 10		11 7 17 0		39.7	
8 16 16 9		8 44 17 11		10 8 14 8		10 35 14 11		11 37 17 3		—		40.7	
9 10 17 5		9 35 17 8		11 1 15 2		11 25 15 4		0 5 17 6		0 30 17 9		41.7	
9 57 17 10		10 20 18 0		11 48 15 6		—		0 56 18 0		1 19 18 2		42.7	
0 42 18 0		11 6 18 1		0 8 15 8		0 30 15 9		1 41 18 4		2 2 18 6		43.7	
1 28 18 0		11 48 17 11		0 51 15 9		1 11 15 9		2 22 18 7		2 41 18 8		44.7	
—		0 8 17 10		1 31 15 9		1 49 15 7		3 0 18 8		3 17 18 7		45.7	
0 28 17 8		0 48 17 6		2 6 15 5		2 23 15 4		3 35 18 6		3 52 18 5		46.7	
7 17 4		1 26 17 1		2 40 15 2		2 57 15 0		4 11 18 3		4 28 18 1		47.7	
45 16 11		2 5 16 8		3 15 14 9		3 34 14 7		4 46 17 11		5 4 17 8		48.7	
an Spring } age.				9ft. 4in.				8ft. 0in.				9ft. 7in.	

## Equation of Time at Noon.

M.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
17		9	16 2		17	14 54		25	12 54	
18		10	15 57		18	14 43		26	12 35	
18		11	15 50		19	14 29		27	12 16	
18		12	15 43		20	14 15		28	11 56	
16		13	15 35		21	14 0		29	11 35	
14		14	15 26		22	13 45		30	11 14	
11		15	15 16		23	13 28				
7		16	15 6		24	13 11				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, — for  
 SHEERNESS subtract 3 m. LONDON 0 m.



## NOVEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.				HULL.				SUNDERLAND.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	
S.	1	4 m 8	2 55	10 6	3 13	10 3	9 31	18 1	9 52	17 7	6 26	12 3	6 48	11 1	
M.	2	4 55	3 33	10 1	3 53	9 10	10 14	17 1	10 40	16 7	7 10	11 6	7 33	11 1	
Tu.	3	5 40	4 14	9 8	4 40	9 6	11 9	16 2	11 43	15 10	8 0	10 10	8 30	10	
W.	4	6 24	5 8	9 5	5 42	9 4	—	—	0 20	15 7	9 6	10 6	9 43	10	
Th.	5	7 6	6 18	9 4	6 58	9 5	0 54	15 6	1 27	15 8	10 19	10 6	10 54	10	
F.	6	7 49	7 36	9 7	8 8	9 9	2 1	15 11	2 30	16 3	11 24	10 11	11 52	11	
S.	7	8 33	8 38	9 11	9 6	10 2	3 0	16 10	3 27	17 5	—	—	0 18	11	
S.	8	9 18	9 32	10 5	9 57	10 8	3 53	18 0	4 17	18 6	0 43	12 0	1 7	12	
M.	9	10 6	10 19	10 10	10 38	11 1	4 37	19 1	4 55	19 6	1 29	12 10	1 50	13	
Tu.	10	10 57	10 57	11 3	11 17	11 6	5 13	19 11	5 33	20 4	2 9	13 6	2 29	13	
W.	11	11 52	11 39	11 7	11 59	11 8	5 55	20 7	6 16	20 10	2 50	14 0	3 8	14	
Th.	12	0 49	—	—	0 17	11 9	6 35	21 0	6 56	21 2	3 27	14 6	3 48	14	
F.	13	1 49	0 37	11 9	1 0	11 9	7 19	21 3	7 40	21 3	4 9	14 8	4 30	14	
S.	14	2 49	1 21	11 8	1 42	11 6	8 02	21 2	8 23	20 10	4 51	14 6	5 13	14	
S.	15	3 47	2 5	11 5	2 28	11 3	8 45	20 6	9 10	20 1	5 36	14 0	6 1	15	
M.	16	4 43	2 52	11 1	3 17	10 11	9 35	19 8	10 1	19 2	6 29	13 4	6 57	15	
Tu.	17	5 37	3 42	10 9	4 9	10 7	10 30	18 8	11 4	18 3	7 26	12 8	7 57	15	
W.	18	6 28	4 38	10 5	5 10	10 3	11 42	17 10	—	—	8 31	12 1	9 5	16	
Th.	19	7 18	5 41	10 2	6 19	10 2	0 19	17 6	0 56	17 5	9 44	11 9	10 21	16	
F.	20	8 7	7 1	10 2	7 37	10 3	1 29	17 5	2 1	17 7	10 54	11 10	11 27	16	
S.	21	8 56	8 12	10 5	8 46	10 7	2 34	17 11	3 7	18 5	11 58	12 4	—	—	
S.	22	9 45	9 15	10 9	9 44	10 11	3 37	18 10	4 4	19 2	0 27	12 8	0 55	17	
M.	23	10 36	10 12	11 1	10 36	11 3	4 30	19 6	4 53	19 10	1 22	13 2	1 48	17	
Tu.	24	11 28	11 0	11 4	11 21	11 5	5 15	20 0	5 37	20 2	2 12	13 6	2 33	17	
W.	25	morn.	11 42	11 5	—	—	5 59	20 2	6 21	20 3	2 54	13 9	3 14	18	
Th.	26	0 19	0 3	11 5	0 24	11 4	6 42	20 3	7 2	20 2	3 34	14 0	3 54	18	
F.	27	1 10	0 44	11 3	1 3	11 2	7 22	20 1	7 39	19 11	4 12	13 10	4 29	18	
S.	28	2 0	1 20	11 1	1 38	10 11	7 57	19 9	8 15	19 6	4 47	13 6	5 5	19	
S.	29	2 48	1 57	10 10	2 15	10 9	8 32	19 3	8 51	18 10	5 23	13 1	5 42	19	
M.	30	3 34	2 33	10 7	2 52	10 5	9 10	18 6	9 29	18 2	6 1	12 7	6 22	19	
Half Mean Spring } Range.			5 ft. 9 in.				10 ft. 5 in.				7 ft. 2 in.				
Phases of the Moon.							Moon's Declination at Noon.								
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'
Last Quarter - 3 3 34 Afternoon.							1	18 N. 44		9	11 S. 55		17	10 S. 59	
New - - - - 11 7 59 Morning.							2	16 18		10	15 38		18	6 20	
First Quarter - 18 3 5 Morning.							3	13 13		11	18 35		19	1 25	
Full - - - - 25 9 1 Morning.							4	9 35		12	20 28		20	3 N. 31	
							5	5 32		13	21 5		21	8 13	
In Apogee - - 3 1 0 Morning.							6	1 13		14	20 20		22	12 27	
In Perigee - - 15 1 0 Morning.							7	3 S. 16		15	18 15		23	16 1	
In Apogee - - 30 10 0 Afternoon.							8	7 42		16	15 3		24	18 43	

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

HARWICH subtract 6 m.

HULL add 1 m.

SUNDERLAND add 6 m.

## NOVEMBER, 1863.

NORTH SHIELDS.						LEITH.						THURSO.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		
6 27	11 2		6 49	10 10		5 23	14 0		5 46	13 7		11 38	10 5		—	—	19.7	
7 13	10 6		7 38	10 1		6 9	13 2		6 32	12 9		0 1	10 0		0 24	9 8	20.7	
8 6	9 8		8 39	9 6		7 1	12 5		7 33	12 2		0 52	9 4		1 24	9 1	(	
9 17	9 4		9 55	9 4		8 10	12 0		8 48	11 10		2 1	8 11		2 40	8 9	22.7	
0 31	9 6		11 6	9 8		9 25	12 1		10 0	12 3		3 21	8 11		3 59	9 0	23.7	
1 37	9 11		—	—		10 30	12 6		10 59	12 10		4 31	9 2		5 1	9 5	24.7	
0 6	10 3		0 31	10 7		11 25	13 2		11 50	13 6		5 27	9 10		5 51	10 3	25.7	
0 55	10 11		1 17	11 3		—	—		0 11	14 0		6 12	10 9		6 30	11 3	26.7	
1 36	11 7		1 55	12 0		0 30	14 5		0 49	14 11		6 47	11 9		7 2	12 2	27.7	
2 12	12 4		2 31	12 8		1 8	15 4		1 28	15 9		7 19	12 8		7 37	13 1	28.7	
3 50	12 11		3 9	13 2		2 46	16 1		2 7	16 4		7 56	13 4		8 14	13 6	●	
4 28	13 4		3 48	13 6		2 26	16 6		2 45	16 7		8 33	13 7		8 54	13 6	1.2	
5 10	13 6		4 32	13 4		3 6	16 7		3 27	16 5		9 16	13 5		9 38	13 4	2.2	
5 54	13 3		5 16	13 0		3 48	16 4		4 11	16 10		1 13	1		10 25	12 9	3.2	
6 40	12 10		6 5	12 7		4 35	15 10		4 59	15 7		10 51	12 5		11 19	12 0	4.2	
7 31	12 3		6 58	12 0		5 27	15 3		5 55	14 10		11 47	11 8		—	—	5.2	
8 29	11 7		8 2	11 2		6 25	14 5		6 56	14 1		0 17	11 3		0 48	10 11	6.2	
9 38	10 10		9 15	10 8		7 32	13 9		8 9	13 6		1 23	10 8		2 0	10 5	7.2	
10 57	10 8		10 33	10 9		8 49	13 5		9 28	13 5		2 41	10 4		3 24	10 4	8.2	
11 7	10 11		11 41	11 10		10 1	13 7		10 34	13 9		3 59	10 4		4 35	10 6	9.2	
—	—		0 12	11 4		11 5	14 0		11 34	14 3		5 7	10 8		5 36	10 11	10.2	
40	11 6		1 5	11 9		11 59	14 6		—	—		6 1	11 3		6 24	11 7	11.2	
29	11 11		1 52	12 2		0 23	14 10		0 47	15 1		6 45	12 0		7 5	12 3	12.2	
14	12 5		2 34	12 7		1 10	15 5		1 31	15 7		7 23	12 6		7 41	12 9	13.2	
54	12 8		3 14	12 9		1 52	15 9		2 13	15 10		8 1	12 10		8 21	12 10	○	
35	12 9		3 54	12 9		2 33	15 10		2 51	15 9		8 39	12 9		8 57	12 7	15.2	
13	12 8		4 31	12 5		3 8	15 8		3 26	15 5		9 15	12 5		9 34	12 3	16.2	
50	12 3		5 8	12 1		3 44	15 3		4 3	15 0		9 53	12 0		10 12	11 9	17.2	
27	11 11		5 46	11 8		4 22	14 10		4 40	14 7		10 31	11 5		10 50	11 2	18.2	
5	11 6		6 25	11 3		4 59	14 4		5 19	14 11		11 11	10 11		11 32	10 8	19.2	
mean Spring } 6ft. 8in. tango.						8ft. 2in.						6ft. 7in.						

Mean Spring } 6ft. 8in.  
Range.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
16 17	Add.	9	16 2	Add.	17	14 54	Add.	25	12 54	Add.
16 18		10	15 57		18	14 42		26	12 35	
16 18		11	15 50		19	14 29		27	12 16	
16 18		12	15 43		20	14 15		28	11 56	
16 16		13	15 35		21	14 0		29	11 35	
16 14		14	15 26		22	13 45		30	11 14	
16 11		15	15 16		23	13 28				
16 7		16	15 6		24	13 11				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 18 m.      THURSO add 14 m.

NOVEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.																																																																																													
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																																																																																										
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																																																																																									
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																																																																																								
S.	1	4m 8	2 50	8 11	3 10	8 10	2 12	22 6	2 20	21 10	9 11	17 5	9 30																																																																																															
M.	2	4 55	3 30	8 8	3 51	8 6	2 40	21 3	3 22	0 7	9 49	16 4	10 10																																																																																															
Tu.	3	5 40	4 15	8 4	4 43	8 3	3 28	19 11	3 58	19 6	10 34	15 3	11 3																																																																																															
W.	4	6 24	5 16	8 1	5 50	8 0	4 34	19 2	5 12	19 1	11 34	14 8	—																																																																																															
Th.	5	7 6	6 25	8 0	7 2	8 0	5 51	19 3	6 31	19 6	0 7	14 9	0 44																																																																																															
F.	6	7 49	7 34	8 1	8 6	8 3	7 42	20 c	7 34	20 7	1 21	15 2	1 55																																																																																															
S.	7	8 33	8 34	8 5	9 2	8 8	8 32	21 3	8 27	21 11	2 26	16 3	2 56																																																																																															
S.	8	9 18	9 27	8 10	9 49	9 0	8 50	22 7	9 10	23 4	3 22	17 8	3 46																																																																																															
M.	9	10 6	10 9	9 2	10 29	9 3	9 29	24 0	9 46	24 7	4 9	18 11	4 31																																																																																															
Tu.	10	10 57	10 50	9 5	11 13	9 6	10 6	25 1	10 27	25 6	4 54	20 0	5 17																																																																																															
W.	11	11 52	11 34	9 7	11 55	9 9	10 47	25 10	11 7	26 2	5 39	20 10	5 59																																																																																															
Th.	12	ca49	—	—	0 17	9 10	11 28	26 5	11 50	26 6	6 19	21 4	6 41																																																																																															
F.	13	1 49	0 39	9 10	1 1	9 11	—	—	0 12	26 6	7 22	5 7	7 23																																																																																															
S.	14	2 49	1 22	9 10	1 44	9 10	0 33	26 4	0 55	26 0	7 45	21 0	8 8																																																																																															
S.	15	3 47	2 6	9 9	2 30	9 7	1 17	25 7	1 40	25 0	8 32	20 3	8 56																																																																																															
M.	16	4 43	2 54	9 6	3 19	9 4	2 42	24 6	2 29	23 11	9 20	19 3	9 45																																																																																															
Tu.	17	5 37	3 46	9 3	4 14	9 1	2 57	23 3	3 25	22 8	10 11	18 3	10 38																																																																																															
W.	18	6 28	4 45	8 11	5 16	8 10	3 59	22 1	4 33	21 7	11 4	17 1	11 36																																																																																															
Th.	19	7 18	5 52	8 8	6 28	8 7	5 13	21 5	5 54	21 7	—	—	0 9																																																																																															
F.	20	8 7	7 3	8 7	7 39	8 8	6 32	21 9	7 8	22 1	0 45	16 10	1 27																																																																																															
S.	21	8 56	8 14	8 10	8 45	8 11	7 42	22 6	8 12	23 0	2 5	17 5	2 39																																																																																															
S.	22	9 45	9 14	9 1	9 42	9 2	8 38	23 6	9 32	23 11	3 9	18 5	3 40																																																																																															
M.	23	10 36	10 7	9 3	10 31	9 3	9 27	24 4	9 49	24 8	4 7	19 3	4 33																																																																																															
Tu.	24	11 28	10 54	9 4	11 17	9 4	10 10	24 10	10 31	25 0	4 58	19 10	5 22																																																																																															
W.	25	morn.	11 40	9 5	—	—	10 52	25 1	11 13	25 1	5 44	20 2	6 6																																																																																															
Th.	26	0 19	0 2	9 5	0 22	9 5	11 34	25 1	11 53	24 11	6 25	20 2	6 43																																																																																															
F.	27	1 10	0 42	9 5	1 1	9 5	—	—	0 11	24 9	7 1	19 11	7 19																																																																																															
S.	28	2 0	1 19	9 4	1 36	9 4	0 30	24 7	0 47	24 3	7 37	19 5	7 55																																																																																															
S.	29	2 48	1 54	9 3	2 12	9 2	1 5	23 11	1 22	23 5	8 13	18 10	8 32																																																																																															
M.	30	3 34	2 30	9 1	2 48	9 0	1 40	23 0	1 58	22 7	8 51	18 2	9 8																																																																																															
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.																																																																																													
Phases of the Moon.																					Moon's Declination at Noon.																																																																																							
D. H. M.																					M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'																																																																			
Last Quarter - 3 3 34 Afternoon.																					1	18	N.44	9	11	S.55	17	10	S.59	25	2	2	16	18	10	15	38	18	6	20	26	2	2	13	13	11	18	35	19	1	25	27	2	2	4	9	35	12	20	28	20	3	N.31	28	1	1	5	5	32	13	21	5	21	8	13	29	1	1	6	1	13	14	20	20	22	12	27	30	1	1	7	3	S.16	15	18	15	23	16	1	8	7	42	16	15	3	24	18	43

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add

## NOVEMBER, 1863.

WESTON-SUPER-MARE.						HOLYHEAD.						KINGSTOWN.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		
9 44 31 10	10		0 30 11	0 57 13 10		1 19 13 6	1 57 9 7		2 19 9 5	19.7								
10 16 29 11	10		0 37 28 11	1 42 13 1		2 5 12 9	2 41 9 2		3 4 9 0	20.7								
11 3 28 2	11		0 36 27 7	2 33 12 4		3 5 12 2	3 31 8 10		4 3 8 8	(								
— — — —	—		0 9 27 3	3 42 12 0		4 21 11 10	4 40 8 6		5 14 8 6	22.7								
0 44 27 5	1		1 22 27 8	4 58 12 1		5 34 12 4	5 47 8 7		6 21 8 9	23.7								
1 56 28 1	2		2 28 28 10	6 4 12 7		6 33 12 10	6 51 8 11		7 20 9 1	24.7								
3 0 29 9	3		3 31 30 8	6 59 13 3		7 23 13 7	7 47 9 4		8 14 9 6	25.7								
4 0 31 8	4		4 26 32 9	7 46 14 0		8 6 14 5	8 39 9 9		9 2 10 0	26.7								
4 50 33 10	5		5 13 34 9	8 24 14 10		8 41 15 2	9 23 10 2		9 42 10 5	27.7								
5 35 35 8	5		5 58 36 4	9 0 15 6		9 21 15 9	10 0 10 7		10 19 10 9	28.7								
6 21 36 10	6		6 42 37 3	9 41 16 0		10 0 16 11	10 37 10 11		10 56 11 0	●								
7 3 37 9	7		7 25 37 11	10 18 16 3		10 37 16 3	11 16 11 1		11 38 11 1	1.2								
7 46 37 11	8		8 6 37 10	10 57 16 3		11 18 16 2	12 0 11 0		— — —	2.2								
8 27 37 6	8		8 48 37 11	11 42 15 11		— — —	0 22 10 11		0 45 10 10	3.2								
9 10 36 6	9		9 32 35 8	0 6 15 8		0 33 15 5	1 9 10 8		1 34 10 5	4.2								
9 53 34 10	10		10 15 33 10	1 0 15 1		1 28 14 8	2 1 10 3		2 28 10 1	5.2								
10 38 32 11	11		11 6 32 0	1 58 14 4		2 29 14 0	2 57 9 11		3 27 9 9	6.2								
11 36 31 3	—		— — —	3 4 13 9		3 41 13 6	4 3 9 6		4 39 9 4	)								
0 11 30 10	0		0 47 30 8	4 22 13 5		5 1 13 6	5 16 9 3		5 50 9 4	8.2								
1 23 30 10	2		1 131 2	5 35 13 8		6 8 13 10	6 22 9 5		6 55 9 7	9.2								
2 37 31 8	3		3 13 32 3	6 39 14 0		7 8 14 3	7 27 9 9		7 57 9 11	10.2								
3 46 32 11	4		4 18 33 8	7 34 14 6		7 59 14 10	8 26 10 0		8 55 10 2	11.2								
4 43 34 4	5		5 15 34 11	8 23 15 0		8 44 15 2	9 21 10 4		9 44 10 5	12.2								
5 39 35 4	6		6 3 35 7	9 4 15 4		9 25 15 5	10 3 10 6		10 22 10 7	13.2								
6 26 35 9	6		6 48 35 10	9 46 15 6		10 6 15 6	10 42 10 8		11 3 10 8	○								
7 9 35 11	7		7 28 35 9	10 24 15 5		10 40 15 4	11 22 10 8		11 41 10 7	15.2								
7 45 35 6	8		8 2 35 2	10 56 15 2		11 14 15 0	11 59 10 6		— — —	16.2								
8 19 34 11	8		8 36 34 7	11 33 14 10		11 53 14 8	0 18 10 4		0 37 10 3	17.2								
8 52 34 1	9		9 9 33 7	— — —		0 12 14 5	0 56 10 1		1 15 9 11	18.2								
9 26 33 0	9		9 42 32 4	0 33 14 2		0 54 13 11	1 34 9 9		1 54 9 8	19.2								
Mean Spring } 18ft. 7in. Range.						8ft. 0in.						5ft. 6in.						

## Equation of Time at Noon.

M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
16 17	Add.	9	16 2	Add.	17	14 54	Add.	25	12 54	Add.
16 18		10	15 57		18	14 42		26	12 35	
16 18		11	15 50		19	14 29		27	12 16	
16 18		12	15 43		20	14 15		28	11 56	
16 16		13	15 35		21	14 0		29	11 35	
16 14		14	15 26		22	13 45		30	11 14	
16 11		15	15 16		23	13 28				
16 7		16	15 6		24	13 11				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WEST-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

NOVEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.								LONDONDERRY.								SLIGO BAY.																																				
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																																
			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.																															
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																													
Sp.	1	4m 8	1	37	8 8	2	0	8 6	11	1	6 0	11	29	5 9	8	20	8 11	8	44	8																																			
M.	2	4 55	2	23	8 4	2	47	8 3	12	0	5 6	—	—	—	9	11	8 4	9	41	8																																			
Tu.	3	5 40	3	15	8 1	3	45	8 0	0	34	5 4	1	12	5 3	10	14	8 0	10	52	7																																			
W.	4	6 24	4	20	7 11	4	55	7 10	1	54	5 3	2	32	5 4	11	28	7 11	—	—	—																																			
Th.	5	7 6	5	29	7 10	6	4	7 11	3	6	5 6	3	39	5 9	0	3	8 0	0	38	8																																			
F.	6	7 49	6	36	7 11	7	6	8 0	4	7	5 11	4	30	6 1	1	9	8 3	1	39	8																																			
S.	7	8 33	7	33	8 2	7	58	8 4	4	52	6 4	5	13	6 6	2	6	8 9	2	30	9																																			
Sp.	8	9 18	8	20	8 7	8	40	8 9	5	32	6 8	5	50	6 11	2	51	9 6	3	10	9																																			
M.	9	10 6	8	59	9 0	9	17	9 2	6	9	7 1	6	28	7 3	3	27	10 1	3	43	10																																			
Tu.	10	10 57	9	36	9 3	9	56	9 5	6	48	7 5	7	10	7 7	4	2	10 9	4	23	11																																			
W.	11	11 52	10	16	9 6	10	35	9 6	7	31	7 8	7	49	7 9	4	44	11 2	5	4	11																																			
Th.	12	0a 49	10	55	9 7	11	15	9 6	8	8	7 11	8	28	7 10	5	25	11 5	5	46	11																																			
F.	13	1 49	11	35	9 6	11	57	9 6	8	47	7 9	9	7	7 8	6	6	11 4	6	27	11																																			
S.	14	2 49	—	—	—	0	21	9 5	9	28	7 6	9	50	7 4	6	50	11 0	7	13	10																																			
Sp.	15	3 47	0	45	9 4	1	12	9 3	10	13	7 2	10	39	6 11	7	37	10 5	8	2	10																																			
M.	16	4 43	1	40	9 2	2	9	9 0	11	10	6 8	11	46	6 5	8	29	9 9	9	0	9																																			
Tu.	17	5 37	2	40	8 10	3	11	8 8	—	—	—	0	25	6 2	9	35	9 3	10	13	9																																			
W.	18	6 28	3	45	8 7	4	20	8 6	1	8	6 1	1	51	6 0	10	51	9 0	11	30	8																																			
Th.	19	7 18	4	56	8 5	5	31	8 4	2	34	6 1	3	9	6 3	—	—	—	0	5	9																																			
F.	20	8 7	6	5	8 4	6	40	8 5	3	39	6 6	4	9	6 8	0	39	9 1	1	13	9																																			
S.	21	8 56	7	13	8 6	7	42	8 7	4	35	6 9	4	58	6 11	1	46	9 4	2	15	9																																			
Sp.	22	9 45	8	8	8 9	8	33	8 11	5	20	7 0	5	43	7 1	2	39	9 10	3	3	10																																			
M.	23	10 36	8	57	9 1	9	20	9 2	6	7	7 3	6	30	7 4	3	25	10 3	3	46	10																																			
Tu.	24	11 28	9	40	9 3	10	1	9 3	6	52	7 4	7	14	7 5	4	6	10 8	4	27	10																																			
W.	25	morn.	10	21	9 4	10	42	9 3	7	36	7 5	7	56	7 5	4	49	10 10	5	11	10																																			
Th.	26	0 19	11	1	9 3	11	18	9 2	8	14	7 5	8	30	7 4	5	31	10 10	5	48	10																																			
F.	27	1 10	11	35	9 2	11	53	9 1	8	46	7 3	9	3	6 1	6	5	10 7	6	23	10																																			
S.	28	2 0	—	—	—	0	12	9 0	9	20	6 11	9	37	6 10	6	42	10 3	7	0	10																																			
Sp.	29	2 48	0	32	9 0	0	51	8 11	9	54	6 8	10	12	6 6	7	18	9 9	7	36	9																																			
M.	30	3 34	1	11	8 10	1	33	8 9	10	32	6 4	10	53	6 2	7	55	9 3	8	15	9																																			
Half Mean Spring Range.			4 ft. 9 in.								3 ft. 10 in.								5 ft. 7 in.																																				
Phases of the Moon.																												Moon's Declination at Noon.																											
D. H. M.																												M.D. ° ' "																											
Last Quarter - 3 3 34 Afternoon.																												1 18 N. 44 9 11 S. 55 17 10 S. 59 25 26																											
New - - - - 11 7 59 Morning.																												2 16 18 10 15 38 18 6 20 26 27 28																											
First Quarter 18 3 5 Morning.																												3 13 13 11 18 35 19 1 25 27 28																											
Full - - - - 25 9 1 Morning.																												4 9 35 12 20 28 20 3 N. 31 28 29 30																											
In Apogee - - 3 1 0 Morning.																												5 5 32 13 21 5 21 8 13 29 30																											
In Perigee - - 15 1 0 Morning.																												6 1 13 14 20 20 22 12 27 30																											
In Apogee - - 30 10 0 Afternoon.																												7 3 8.16 15 18 15 23 16 1																											
																												8 7 42 16 15 3 24 18 43																											

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required BELFAST subtract 2 m. LONDONDERRY add 4 m. SLIGO BAY add 9 m.

## NOVEMBER, 1863.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's AGE AT NOON.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.		
7 44 12 0	8 6 11 6	8 1 9 11	8 20 9 8	8 20 10 11	8 37 10 8	19.7									
8 29 11 0	8 55 10 7	8 41 9 4	9 2 9 1	8 55 10 5	9 18 10 1	20.7									
9 24 10 4	10 0 10 2	9 28 8 11	10 0 8 9	9 47 9 10	10 22 9 7	21.7									
0 36 10 2	11 13 10 3	10 34 8 8	11 10 8 9	10 55 9 6	11 28 9 6	22.7									
1 50 10 6	—	11 48 8 10	—	—	0 1 9 6	23.7									
0 21 10 9	0 51 11 1	0 20 9 0	0 52 9 2	0 32 9 9	1 2 9 11	24.7									
1 17 11 6	1 31 11 11	1 23 9 5	1 52 9 9	1 32 10 2	2 2 10 6	25.7									
2 3 12 5	2 24 12 10	2 18 10 0	2 41 10 4	2 30 10 10	2 56 11 2	26.7									
2 44 13 3	3 3 13 8	3 3 10 8	3 23 11 0	3 19 11 5	3 41 11 9	27.7									
3 22 14 0	3 43 14 4	3 44 11 3	4 6 11 6	4 4 12 0	4 28 12 2	28.7									
4 4 14 7	4 23 14 10	4 27 11 8	4 47 11 10	4 50 12 4	5 10 12 5	29.7									
4 42 15 1	5 5 15 2	5 9 11 11	5 31 12 0	5 30 12 7	5 52 12 8	30.7									
5 27 15 1	5 49 15 0	5 53 12 0	6 14 11 11	6 14 12 8	6 36 12 7	31.7									
6 11 14 9	6 34 14 6	6 36 11 9	6 59 11 7	6 58 12 6	7 20 12 5	32.7									
6 59 14 2	7 26 13 10	7 23 11 4	7 47 11 1	7 43 12 3	8 6 12 1	33.7									
7 53 13 5	8 22 12 11	8 11 10 10	8 36 10 7	8 29 11 10	8 53 11 7	34.7									
8 52 12 5	9 25 12 1	9 3 10 4	9 31 10 1	9 17 11 4	9 48 11 0	35.7									
9 59 11 10	10 38 11 9	10 1 9 10	10 37 9 9	10 22 10 9	10 58 10 7	36.7									
11 16 11 10	11 51 11 11	11 13 9 9	11 49 9 9	11 31 10 6	—	37.7									
—	0 25 12 2	—	0 25 9 11	0 3 10 6	0 36 10 8	38.7									
0 57 12 5	1 26 12 8	1 1 10 1	1 35 10 3	1 10 10 9	1 44 11 0	39.7									
1 52 13 0	2 17 13 3	2 5 10 5	2 34 10 8	2 16 11 3	2 48 11 5	40.7									
2 43 13 6	3 6 13 9	3 1 10 10	3 26 11 0	3 17 11 7	3 44 11 9	41.7									
3 27 13 11	3 47 14 0	3 48 11 2	4 10 11 3	4 9 11 11	4 33 12 0	42.7									
4 8 14 1	4 29 14 2	4 32 11 4	4 54 11 4	4 55 12 0	5 17 12 0	43.7									
4 48 14 3	5 8 14 2	5 15 11 4	5 35 11 3	5 36 12 0	5 55 12 0	44.7									
5 26 14 0	5 44 13 10	5 53 11 2	6 11 11 1	6 13 11 11	6 32 11 10	45.7									
6 3 13 8	6 21 13 5	6 29 11 0	6 47 10 10	6 50 11 5	7 8 11 8	46.7									
6 40 13 1	6 59 12 10	7 5 10 8	7 23 10 6	7 25 11 6	7 42 11 5	47.7									
7 19 12 7	7 39 12 3	7 41 10 3	7 58 10 1	7 59 11 3	8 16 11 1	48.7									
Mean Spring } 7ft. 5in.					5ft. 10in.					6ft. 2in.					
Range. }															

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
16 17		9	16 2		17	14 54		25	12 54	
16 18		10	15 57		18	14 42		26	12 35	
16 18		11	15 50		19	14 29		27	12 16	
16 18		12	15 43		20	14 15		28	11 56	
16 16		13	15 35		21	14 0		29	11 35	
16 14		14	15 26		22	13 45		30	11 14	
16 11		15	15 16		23	13 28				
16 7		16	15 6		24	13 11				

rs of High Water are given for Mean Time at Place; if Dublin or Railway Time be require d,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 8 m.



## TIDE TABLES FOR THE

DECEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Tu.	1	4m18	7 3 15	4	7 23 14	11	8 40 13	3	9 0 12	4	2 43 11	1	3 3 10	11	W.	2	5 1	7 45 14	5	8 9 14	0	9 20 12	8	9 40 11	9	3 22 10	9	3 43 10	7	Th.	3	5 43	8 34 13	9	9 3 13	7	10 6 12	3	10 31 11	7	4 6 10	4	4 30 10		F.	4	6 26	9 34 13	6	10 8 13	7	10 59 12	0	11 33 11	7	4 58 10	0	5 27 9	11	S.	5	7 9	10 45 13	9	11 19 14	0	—	—	0 9 12	3	6 0 9	11	6 34 10	0	♄	6	7 55	11 52 14	5	—	—	0 47 12	2	1 22 12	9	7 6 10	2	7 39 10	5	M.	7	8 44	0 22 14	10	0 50 15	5	1 55 12	11	2 27 13	3	8 11 10	8	8 41 11	0	Tu.	8	9 36	1 17 16	1	1 41 16	9	2 57 13	7	3 25 14	0	9 9 11	4	9 34 11	8	W.	9	10 32	2 4 17	5	2 26 18	0	3 52 14	4	4 17 14	8	9 59 11	11	10 22 12	2	Th.	10	11 32	2 49 18	7	3 12 19	1	4 42 15	1	5 7 15	2	10 45 12	5	11 8 12	8	F.	11	0a34	3 35 19	4	4 0 19	7	5 30 15	8	5 54 15	6	11 31 12	10	11 56 12	11	S.	12	1 35	4 25 19	9	4 48 19	10	6 18 16	1	6 43 15	8	—	—	0 22 13	0	♄	13	2 34	5 12 19	9	5 35 19	7	7 6 16	2	7 29 15	6	0 47 13	0	1 11 12	11	M.	14	3 31	5 59 19	4	6 24 18	11	7 52 16	1	8 15 15	2	1 36 12	11	2 0 12	9	Tu.	15	4 24	6 49 18	5	7 14 17	9	8 39 15	8	9 2 14	6	2 25 12	7	2 49 12	5	W.	16	5 15	7 41 17	2	8 7 16	6	9 26 14	10	9 52 13	11	3 14 12	2	3 40 11	11	Th.	17	6 5	8 34 15	11	9 2 15	5	10 17 14	1	10 44 13	3	4 5 11	7	4 31 11	4	F.	18	6 54	9 34 15	1	10 9 14	11	11 12 13	5	11 44 12	10	4 58 11	0	5 28 10	9	S.	19	7 42	10 47 14	9	11 22 14	9	—	—	0 20 13	1	6 1 10	7	6 36 10	6	♄	20	8 32	12 0 14	10	—	—	0 57 12	11	1 32 13	1	7 11 10	6	7 47 10	8	M.	21	9 22	0 33 15	0	1 4 15	4	2 7 13	1	2 38 13	3	8 23 10	10	8 55 11	0	Tu.	22	10 13	1 32 15	9	1 57 16	2	3 11 13	7	3 39 13	9	9 24 11	2	9 51 11	4	W.	23	11 4	2 21 16	6	2 43 16	11	4 5 14	2	4 29 14	10	16 11	6	10 38 11	8	Th.	24	11 54	3 3 17	3	3 24 17	6	4 52 14	7	5 15 14	4	10 59 11	9	11 20 11	10	F.	25	morn.	3 43 17	7	4 2 17	8	5 36 14	11	5 55 14	5	11 39 11	11	11 58 12	0	S.	26	0 42	4 20 17	8	4 38 17	8	6 12 15	0	6 31 14	5	—	—	0 17 11	11	♄	27	1 29	4 54 17	8	5 12 17	7	6 48 15	0	7 2 14	3	0 35 11	11	0 54 11	11	M.	28	2 14	5 28 17	6	5 44 17	4	7 18 14	10	7 34 14	0	1 12 11	10	1 28 11	10	Tu.	29	2 57	6 0 17	2	6 18 16	11	7 50 14	5	8 6 13	6	1 45 11	9	2 2 11	8	W.	30	3 40	6 36 16	8	6 54 16	3	8 22 13	11	8 36 13	1	2 19 11	7	2 37 11	6	Th.	31	4 21	7 13 15	11	7 32 15	6	8 52 13	5	9 9 12	8	2 55 11	4	3 13 11	3
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Phases of the Moon.																								Moon's Declination at Noon.																																																																																																																																																																																																																																																																																																																																																																																																																																																								
D. H. M.																								M.D. ° ' "																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Last Quarter - 3 0 14 Afternoon.																								1 10 N. 50 9 19 S. 50 17 2 N. 22 25 19 N. 55																																																																																																																																																																																																																																																																																																																																																																																																																																																								
New - - - - 10 8 23 Afternoon.																								2 6 57 10 21 1 18 7 8 26 17 59																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Full - - - - 25 2 50 Morning.																								4 18.35 12 19 9 20 15 10 28 12 2																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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In Perigee - - 12 5 0 Afternoon.																								6 10 14 14 12 15 22 20 2 30 4 13																																																																																																																																																																																																																																																																																																																																																																																																																																																								
In Apogee - - 28 3 0 Afternoon.																								7 14 9 15 7 36 23 21 0 31 0 8.3																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 6 m.





## DECEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
			H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.	
Tu.	1	4m18	3 11	10 4		3 29	10 2		9 47	17 10		10 8	17 6		6 43	12 1		7		
W.	2	5 1	3 49	10 0		4 8	9 11		10 30	17 2		10 57	16 10		7 26	11 7		7		
Th.	3	5 43	4 31	9 10		4 55	9 8		11 25	16 6		11 56	16 3		8 15	11 2		8		
F.	4	6 26	5 20	9 7		5 49	9 7		—	—		0 27	16 1		9 13	10 11		9		
S.	5	7 9	6 21	9 7		6 58	9 8		0 57	16 1		1 28	16 2		10 19	10 11		10		
♄.	6	7 55	7 34	9 9		8 5	9 11		1 59	16 4		2 28	16 8		11 22	11 2		11		
M.	7	8 44	8 36	10 1		9 6	10 3		2 58	17 2		3 27	17 9		—	—		0		
Tu.	8	9 36	9 33	10 6		10 0	10 9		3 54	18 3		4 20	18 10		0 44	12 3		1		
W.	9	10 32	10 25	11 0		10 48	11 2		4 43	19 4		5 5	19 9		1 35	13 0		2		
Th.	10	11 32	11 12	11 5		11 35	11 7		5 27	20 2		5 51	20 6		2 24	13 8		2		
F.	11	0a34	11 58	11 8		—	—		6 15	20 10		6 39	21 1		3 9	14 3		3		
S.	12	1 35	0 21	11 9		0 45	11 10		7 3	21 4		7 29	21 6		3 55	14 9		4		
♄.	13	2 34	1 10	11 10		1 34	11 9		7 52	21 6		8 15	21 6		4 42	14 10		5		
M.	14	3 31	1 57	11 8		2 21	11 7		8 39	21 3		9 42	21 0		5 29	14 6		5		
Tu.	15	4 24	2 46	11 5		3 12	11 4		9 29	20 7		9 54	20 2		6 21	14 0		6		
W.	16	5 15	3 36	11 2		4 0	10 11		10 20	19 8		10 47	19 2		7 15	13 4		7		
Th.	17	6 5	4 26	10 9		4 53	10 7		11 19	18 9		11 52	18 3		8 12	12 8		8		
F.	18	6 54	5 20	10 5		5 48	10 3		—	—		0 25	17 9		9 11	12 1		9		
S.	19	7 42	6 20	10 2		6 58	10 2		0 58	17 6		1 30	17 3		10 20	11 8		10		
♄.	20	8 32	7 36	10 2		8 10	10 2		2 2	17 3		2 33	17 4		11 26	11 8		11		
M.	21	9 22	8 44	10 3		9 17	10 4		3 6	17 7		3 38	17 11		—	—		0		
Tu.	22	10 13	9 47	10 6		10 15	10 8		4 8	18 2		4 35	18 6		0 58	12 2		1		
W.	23	11 4	10 41	10 9		11 5	10 11		4 59	18 9		5 22	19 0		1 52	12 8		2		
Th.	24	11 54	11 28	11 0		11 49	11 1		5 43	19 2		6 5	19 4		2 40	13 0		3		
F.	25	morn.	—	—		0 10	11 1		6 27	19 6		6 47	19 7		3 20	13 3		3		
S.	26	0 42	0 29	11 1		0 47	11 1		7 6	19 8		7 24	19 8		3 57	13 6		4		
♄.	27	1 29	1 5	11 1		1 23	11 0		7 42	19 8		7 59	19 8		4 32	13 7		4		
M.	28	2 14	1 40	10 11		1 58	10 11		8 16	19 7		8 32	19 6		5 6	13 5		5		
Tu.	29	2 57	2 14	10 10		2 31	10 9		8 48	19 4		9 6	19 1		5 39	13 2		5		
W.	30	3 40	2 48	10 8		3 6	10 7		9 24	18 10		9 42	18 7		6 15	12 9		6		
Th.	31	4 21	3 24	10 6		3 42	10 4		10 0	18 4		10 19	18 0		6 54	12 5		7		
Half Mean Spring } Range.			5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.					
Phases of the Moon.										Moon's Declination at Noon.										
			D.	H.	M.					M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°
Last Quarter	3	0	14	Afternoon.		1	10	N. 50		9	19	S. 50		17	2	N. 22		25		
New	10	8	23	Afternoon.		2	6	57		10	21	1		18	7	8		26		
First Quarter	17	11	46	Morning.		3	2	46		11	20	48		19	11	28		27		
Full	25	2	50	Morning.		4	1	S. 35		12	19	9		20	15	10		28		
						5	5	59		13	16	12		21	18	4		29		
In Perigee	12	5	0	Afternoon.		6	10	14		14	12	15		22	20	2		30		
In Apogee	28	3	0	Afternoon.		7	14	9		15	7	36		23	21	0		31		
						8	17	27		16	2	38		24	20	57				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.

## DECEMBER, 1863.

NORTH SHIELDS.								LEITH.								THURSO.								C's Age at Noon.
MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	D.						
1 6 44	11 0	7 6	10 9	5 40	13 10	6 2	13 6	11 54	10 4	—	—	20' 2												
2 7 29	10 6	7 55	10 2	6 24	13 3	6 49	13 0	0 16	10 1	0 41	9 10	21' 2												
3 8 22	9 11	8 52	9 10	7 17	12 9	7 46	12 7	1 7	9 8	1 37	9 6	(												
4 9 24	9 9	9 58	9 9	8 17	12 5	8 51	12 5	2 8	9 4	2 43	9 4	23' 2												
5 10 31	9 10	11 4	10 0	9 25	12 6	9 58	12 7	3 21	9 4	3 57	9 5	24' 2												
6 11 35	10 3	—	—	10 28	12 10	10 57	13 1	4 28	9 7	4 59	9 9	25' 2												
7 0 4	10 6	0 32	10 9	11 25	13 5	11 51	13 9	5 27	10 1	5 52	10 6	26' 2												
8 0 56	11 1	1 20	11 5	—	—	0 14	14 2	6 15	10 11	6 35	11 6	27' 2												
9 1 42	11 10	2 4	12 2	0 36	14 8	0 59	15 2	6 56	12 0	7 15	12 6	28' 2												
0 2 26	12 6	2 47	12 10	1 22	15 7	1 44	15 11	7 34	12 11	7 55	13 3	●												
1 3 9	13 2	3 32	13 5	2 7	16 3	2 30	16 6	8 17	13 6	8 40	13 8	0' 7												
2 3 55	13 7	4 19	13 8	2 52	16 8	3 15	16 9	9 4	13 9	9 28	13 8	1' 7												
3 4 44	13 7	5 9	13 5	3 39	16 8	4 3	16 7	9 53	13 7	10 18	13 4	2' 7												
4 5 34	13 4	5 59	13 2	4 28	16 5	4 53	16 2	10 44	13 1	11 11	12 9	3' 7												
5 6 25	12 11	6 51	12 8	5 19	15 11	5 46	15 8	11 38	12 5	—	—	4' 7												
6 7 17	12 4	7 46	11 11	6 14	15 3	6 42	14 10	0 5	12 0	0 34	11 8	5' 7												
7 8 17	11 6	8 48	11 2	7 11	14 5	7 43	14 1	1 3	11 4	1 33	11 0	6' 7												
8 9 21	10 10	9 57	10 9	8 15	13 8	8 49	13 6	2 6	10 8	2 41	10 5	7' 7												
9 10 32	10 8	11 6	10 8	9 26	13 4	10 1	13 4	3 21	10 3	3 59	10 2	8' 7												
10 11 39	10 9	—	—	10 33	13 4	11 5	13 5	4 33	10 1	5 7	10 1	9' 7												
11 0 12	10 10	0 42	10 11	11 36	13 6	—	—	5 38	10 2	6 6	10 5	10' 7												
12 1 10	11 0	1 35	11 2	0 4	13 9	0 29	14 0	6 30	10 9	6 51	11 1	11' 7												
13 1 58	11 5	2 21	11 8	0 53	14 3	1 16	14 7	7 12	11 5	7 31	11 9	12' 7												
14 2 42	11 10	3 2	12 0	1 38	14 10	1 59	15 0	7 49	12 0	8 7	12 3	13' 7												
15 3 21	12 2	3 39	12 4	2 19	15 2	2 38	15 4	8 26	12 4	8 43	12 4	○												
16 3 58	12 5	4 16	12 5	2 55	15 5	3 12	15 5	9 0	12 4	9 17	12 3	15' 7												
17 4 33	12 4	4 52	12 3	3 29	15 4	3 46	15 2	9 36	12 2	9 54	12 1	16' 7												
18 5 9	12 2	5 26	12 0	4 4	15 1	4 21	15 0	10 11	12 0	10 28	11 10	17' 7												
19 5 43	11 11	6 1	11 9	4 38	14 10	4 55	14 8	10 46	11 7	11 5	11 5	18' 7												
20 6 19	11 8	6 37	11 6	5 13	14 7	5 32	14 5	11 25	11 2	11 44	11 0	19' 7												
21 6 56	11 4	7 16	11 2	5 52	14 2	6 13	13 11	—	—	0 4	10 9	20' 7												
Mean Spring } 6ft. 8in. Range.								8ft. 2in.								6ft. 7in.								

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
10 52		9	7 33		17	3 45		25	0 13	
10 29		10	7 5		18	3 16		26	0 43	
10 5		11	6 38		19	2 46		27	1 13	
9 41		12	6 10		20	2 16		28	1 42	
9 17		13	5 42		21	1 46		29	2 11	
8 51		14	5 13		22	1 17		30	2 41	
8 26		15	4 44		23	0 47		31	3 9	
7 59		16	4 15		24	0 17				

Notes of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 12 m.      THURSO add 14 m.

## DECEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.																														
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																										
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.																											
		H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																												
Tu.	1	4m18	3 6	8 11	3 25	8 9	2 16	22 2	2 36	21 5	9 26	17 4	9 44	17 0																																			
W.	2	5 1	3 45	8 8	4 7	8 7	2 56	21 4	3 18	20 10	10 4	16 7	10 25	16 2																																			
Th.	3	5 43	4 30	8 6	4 55	8 5	3 43	20 5	4 11	20 1	10 46	15 9	11 10	15 3																																			
F.	4	6 20	5 23	8 4	5 53	8 3	4 41	19 10	5 15	19 10	11 38	15 4	—	—																																			
S.	5	7 9	6 26	8 2	6 59	8 2	5 51	19 11	6 29	20 2	0 8	15 4	0 41	15 6																																			
S.	6	7 55	7 31	8 3	8 4	8 5	7 12	20 6	7 32	21 0	1 17	15 8	1 53	16 1																																			
M.	7	8 44	8 34	8 7	9 3	8 9	8 3	21 7	8 28	22 3	2 26	16 8	2 57	17 3																																			
Tu.	8	9 36	9 30	8 11	9 55	9 1	8 52	23 0	9 16	23 8	3 26	18 0	3 54	18 8																																			
W.	9	10 32	10 19	9 3	10 44	9 4	9 39	24 4	10 1	24 10	4 21	19 3	4 47	19 10																																			
Th.	10	11 32	11 9	9 6	11 34	9 7	10 23	25 4	10 46	25 9	5 13	20 4	5 38	20 9																																			
F.	11	0 34	11 59	9 9	—	—	11 10	26 3	11 35	26 7	6 3	21 2	6 27	21 6																																			
S.	12	1 35	0 24	9 10	0 49	9 11	12 0	26 9	—	—	6 51	21 8	7 14	21 9																																			
S.	13	2 34	1 14	10 0	1 38	10 0	0 24	26 10	0 48	26 9	7 38	21 8	8 2	21 6																																			
M.	14	3 31	2 1	10 0	2 25	9 11	1 11	26 6	1 35	26 1	8 26	21 2	8 51	20 10																																			
Tu.	15	4 24	2 49	9 10	3 13	9 8	2 0	25 8	2 24	25 1	9 15	20 4	9 39	19 9																																			
W.	16	5 15	3 37	9 6	4 3	9 5	2 48	24 6	3 13	23 11	10 2	19 3	10 26	18 9																																			
Th.	17	6 5	4 29	9 3	4 55	9 1	3 40	23 3	4 9	22 7	10 49	18 1	11 13	17 5																																			
F.	18	6 54	5 23	8 11	5 54	8 9	4 39	21 11	5 13	21 7	11 39	17 0	—	—																																			
S.	19	7 42	6 27	8 7	7 1	8 6	5 51	21 4	6 31	21 3	0 10	16 8	0 43	16 6																																			
S.	20	8 32	7 35	8 6	8 11	8 7	7 6	21 4	7 40	21 7	1 21	16 5	2 12	16 7																																			
M.	21	9 22	8 45	8 8	9 17	8 9	8 14	21 10	8 42	22 2	2 38	16 10	3 12	17 2																																			
Tu.	22	10 13	9 45	8 10	10 12	8 11	9 8	22 7	9 32	23 0	3 42	17 8	4 11	18 1																																			
W.	23	11 4	10 36	8 11	11 0	9 0	9 55	23 4	10 17	23 7	4 38	18 5	5 3	18 9																																			
Th.	24	11 54	11 23	9 1	11 45	9 1	10 38	23 10	10 58	24 0	5 28	19 0	5 50	19 3																																			
F.	25	morn.	—	—	0 6	9 2	11 18	24 3	11 37	24 5	6 10	19 5	6 28	19 7																																			
S.	26	0 42	0 26	9 3	0 44	9 3	11 56	24 5	—	—	6 47	19 8	7 4	19 8																																			
S.	27	1 29	1 2	9 4	1 20	9 4	0 14	24 6	0 32	24 5	7 21	19 7	7 38	19 6																																			
M.	28	2 14	1 38	9 4	1 54	9 4	0 49	24 4	1 5	24 3	7 54	19 5	8 11	19 3																																			
Tu.	29	2 57	2 10	9 4	2 27	9 3	1 21	24 0	1 37	23 8	8 28	19 0	8 46	18 10																																			
W.	30	3 40	2 44	9 2	3 2	9 1	1 54	23 5	2 12	23 1	9 4	18 7	9 21	18 3																																			
Th.	31	4 21	3 19	9 0	3 36	8 11	2 30	22 9	2 47	22 5	9 38	17 11	9 55	17 7																																			
Half Mean Spring Range.			4 ft. 10 in.				13 ft. 0 in.				10 ft. 6 in.																																						
Phases of the Moon.																									Moon's Declination at Noon.																								
D H. M.																									M.D. ° ' M.D.																								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

## DECEMBER, 1863.

WESTON-SUPER-MARE.										HOLYHEAD.										KINGSTOWN.										C's Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time. H. M. F. L.	Height. F. L.				Time. H. M. F. L.	Height. F. L.				Time. H. M. F. L.	Height. F. L.				Time. H. M. F. L.	Height. F. L.				Time. H. M. F. L.	Height. F. L.				Time. H. M. F. L.	Height. F. L.				
9 58 31 8					10 14 31 1					1 15 13 8					1 36 13 5					2 14 9 6					2 35 9 4					20'2
10 31 30 4					10 52 29 7					1 57 13 2					2 22 13 0					2 56 9 3					3 20 9 1					21'2
11 15 29 1					11 43 28 8					2 48 12 8					3 18 12 6					3 47 8 11					4 16 8 10					22'2
— — —					0 13 28 5					3 49 12 6					4 23 12 5					4 46 8 9					5 17 8 9					23'2
0 45 28 5					1 19 28 7					4 58 12 6					5 32 12 8					5 49 8 9					6 19 8 11					24'2
1 52 28 11					2 26 29 7					6 2 12 11					6 31 13 2					6 49 9 1					7 18 9 3					25'2
2 59 30 3					3 32 31 2					6 59 13 5					7 24 13 10					7 47 9 10					8 15 9 7					26'2
4 33 32 2					4 33 33 4					7 49 14 3					8 12 14 8					8 42 9 10					9 8 10 1					27'2
5 23 34 4					5 28 35 3					8 34 15 0					8 56 15 4					9 33 10 3					9 55 10 6					28'2
5 54 36 1					6 20 36 10					9 18 15 8					9 40 15 11					10 15 10 9					10 37 10 11					29'2
6 45 37 5					7 10 38 4					10 3 16 2					10 25 16 4					11 0 11 1					11 23 11 2					30'2
7 35 38 5					7 58 38 6					10 47 16 5					11 9 16 6					11 47 11 2					— — —					31'2
8 21 38 6					8 43 38 3					11 34 16 5					11 59 16 3					0 12 11 2					0 37 11 1					32'2
9 6 37 11					9 29 37 5					— — —					0 25 16 1					1 1 2 11 0					1 28 10 10					33'2
9 50 36 7					10 11 35 8					0 52 15 9					1 20 15 5					1 54 10 8					2 20 10 6					34'2
10 32 34 9					10 53 33 9					1 47 15 1					2 15 14 9					2 47 10 3					3 14 10 1					35'2
11 17 32 9					11 43 31 9					2 44 14 5					3 14 14 0					3 42 9 11					4 13 9 8					36'2
— — —					0 14 31 0					3 47 13 8					4 22 13 6					4 45 9 6					5 18 9 4					37'2
0 46 30 6					1 21 30 3					4 59 13 5					5 34 13 4					5 50 9 3					6 22 9 3					38'2
1 56 30 2					2 34 30 4					6 7 13 5					6 39 13 6					6 54 9 4					7 26 9 5					39'2
3 11 30 7					3 47 31 0					7 10 13 7					7 38 13 9					7 58 9 6					8 29 9 7					40'2
4 20 31 8					4 51 32 4					8 4 14 0					8 28 14 2					8 57 9 9					9 25 9 10					41'2
5 19 32 11					5 44 33 5					8 50 14 5					9 11 14 7					9 50 10 0					10 11 10 1					42'2
6 9 33 11					6 32 34 3					9 32 14 9					9 52 14 10					10 30 10 3					10 49 10 4					43'2
6 52 34 7					7 12 34 10					10 11 15 0					10 28 15 0					11 8 10 5					11 26 10 6					44'2
7 31 35 0					7 48 35 1					10 44 15 1					11 0 15 0					11 43 10 5					— — —					45'2
8 53 35 1					8 22 35 0					11 16 15 0					11 33 14 11					0 1 10 5					0 20 10 4					46'2
8 37 34 11					8 52 34 9					11 51 14 10					— — —					0 38 10 4					0 55 10 3					47'2
9 7 34 5					9 23 34 1					0 9 14 9					0 27 14 7					1 12 10 2					1 30 10 0					48'2
9 40 33 9					9 55 33 2					0 47 15 5					1 7 14 3					1 48 9 11					2 7 9 10					49'2
10 10 32 8					10 25 32 0					1 26 14 0					1 46 13 9					2 26 9 8					2 46 9 7					50'2
Mean Spring range. } 18ft. 7in.										8ft. 0in.										5ft. 6in.										

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
10 52		9	7 33		17	3 45		25	0 13	
10 29		10	7 5		18	3 16		26	0 43	
10 5		11	6 38		19	2 46		27	1 13	
9 41		12	6 10		20	2 16		28	1 42	
9 17		13	5 42		21	1 46		29	2 11	
8 51		14	5 13		22	1 17		30	2 41	
8 26		15	4 44		23	0 47		31	3 9	
7 59		16	4 15		24	0 17				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 12 m. | KINGSTOWN subtract 1 m. for Dublin Time.

DECEMBER, 1863.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
Tu.	1	4m18	1 55	8 7	2 18	8 6	11 19	6 0	11 46	5 9	8 37	8 10	9 1	8 1	
W.	2	5 1	2 41	8 5	3 4	8 3	—	—	0 18	5 7	9 28	8 6	9 57	8 1	
Th.	3	5 43	3 30	8 2	3 58	8 1	0 50	5 6	1 24	5 5	10 27	8 3	10 59	8 1	
F.	4	6 26	4 28	8 1	4 58	8 0	2 0	5 5	2 35	5 6	11 31	8 3	—	—	
S.	5	7 9	5 30	8 0	6 2	8 0	3 8	5 8	3 38	5 11	0 3	8 3	0 36	8 1	
♄.	6	7 55	6 33	8 1	7 4	8 2	4 5	6 1	4 30	6 3	1 7	8 6	1 37	8 1	
M.	7	8 44	7 33	8 3	7 59	8 5	4 53	6 5	5 14	6 7	2 6	8 11	2 31	9 1	
Tu.	8	9 36	8 23	8 8	8 46	8 11	5 34	6 10	5 56	7 0	2 54	9 7	3 15	9 1	
W.	9	10 32	9 9	9 1	9 31	9 3	6 19	7 2	6 43	7 4	3 36	10 3	3 57	10 1	
Th.	10	11 32	9 54	9 4	10 16	9 5	7 6	7 6	7 30	7 8	4 20	10 11	4 44	11 1	
F.	11	0a34	10 39	9 6	11 2	9 7	7 53	7 10	8 15	7 11	5 8	11 4	5 32	11 1	
S.	12	1 35	11 25	9 7	11 48	9 7	8 37	8 0	8 59	7 11	5 55	11 7	6 18	11 1	
♄.	13	2 34	—	—	0 13	9 7	9 22	7 10	9 44	7 8	6 42	11 5	7 7	11 1	
M.	14	3 31	0 38	9 7	1 4	9 6	10 7	7 6	10 32	7 4	7 31	10 11	7 56	10 1	
Tu.	15	4 24	1 32	9 5	2 0	9 3	10 58	7 2	11 29	6 11	8 21	10 4	8 48	10 1	
W.	16	5 15	2 29	9 1	2 57	8 11	—	—	0 3	6 8	9 18	9 9	9 50	9 1	
Th.	17	6 5	3 26	8 10	3 56	8 8	0 40	6 5	1 17	6 2	10 23	9 3	10 56	9 1	
F.	18	6 54	4 26	8 6	4 59	8 5	1 55	6 1	2 34	6 11	11 30	9 0	—	—	
S.	19	7 42	5 32	8 4	6 5	8 3	3 9	6 2	3 41	6 3	0 4	8 11	0 38	8 11	
♄.	20	8 32	6 38	8 3	7 12	8 3	4 9	6 5	4 37	6 6	1 11	8 10	1 45	8 11	
M.	21	9 22	7 44	8 4	8 12	8 5	5 3	6 6	5 26	6 7	2 17	9 1	2 44	9 1	
Tu.	22	10 13	8 38	8 7	9 2	8 9	5 49	6 8	6 12	6 9	3 9	9 5	3 31	9 1	
W.	23	11 4	9 25	8 10	9 47	8 11	6 36	6 10	6 59	6 11	3 52	9 10	4 13	10 1	
Th.	24	11 54	10 8	9 0	10 28	9 1	7 21	7 0	7 42	7 1	4 34	10 3	4 55	10 4	
F.	25	morn.	10 47	9 1	11 5	9 1	8 1	7 2	8 18	7 3	5 15	10 6	5 34	10 7	
S.	26	0 42	11 22	9 1	11 38	9 1	8 35	7 3	8 50	7 2	5 52	10 7	6 8	10 7	
♄.	27	1 29	11 55	9 1	—	—	9 6	7 1	9 22	7 0	6 25	10 5	6 42	10 4	
M.	28	2 14	0 13	9 1	0 30	9 0	9 38	6 11	9 53	6 10	6 59	10 3	7 16	10 1	
Tu.	29	2 57	0 48	9 0	1 6	8 11	10 9	6 9	10 26	6 7	7 33	9 10	7 51	9 8	
W.	30	3 40	1 26	8 11	1 46	8 10	10 45	6 6	11 5	6 4	8 8	9 6	8 27	9 1	
Th.	31	4 21	2 7	8 9	2 28	8 8	11 29	6 2	11 54	6 0	8 47	9 1	9 9	8 11	
Half Mean Spring Range.			4ft. 9in.				3ft. 10in.				5ft. 7in.				
Phases of the Moon.							Moon's Declination at Noon.								
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'
Last Quarter - 3 0 14 Afternoon.							1	10	N.50	9	19	S.50	17	2	N.22
New - - - - 10 8 23 Afternoon.							2	6	57	10	21	1	18	7	8
First Quarter - 17 11 46 Morning.							3	2	46	11	20	48	19	11	28
Full - - - - 25 2 50 Morning.							4	1	S.35	12	19	9	20	15	10
							5	5	59	13	16	12	21	18	4
In Perigee - - 12 5 0 Afternoon.							6	10	14	14	12	15	22	20	2
In Apogee - - 28 3 0 Afternoon.							7	14	9	15	7	36	23	21	0
							8	17	27	16	2	38	24	20	57

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—  
BELFAST subtract 2 m. | LONDONDERRY add 4 m. | SLIGO BAY add 8 m.

## DECEMBER, 1863.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	D.	
3 0	11 11		8 21	11 7		8 16	9 11		8 35	9 8		8 33	10 11		8 51	10 9	20'2	
3 44	11 3		9 9	10 11		8 56	9 6		9 17	9 4		9 10	10 6		9 33	10 4	21'2	
3 37	10 9		10 7	10 7		9 40	9 2		10 7	9 11		10 0	10 1		10 29	9 11	(	
3 39	10 8		11 13	10 9		10 38	9 0		11 11	9 0		10 59	9 10		11 30	9 9	23'2	
1 48	10 11		—	—		11 45	9 1		—	—		12 0	9 10		—	—	24'2	
3 19	11 1		0 49	11 5		0 18	9 3		0 50	9 5		0 30	10 0		1 0	10 2	25'2	
1 17	11 9		1 42	12 2		1 23	9 8		1 53	9 11		1 31	10 4		2 3	10 8	26'2	
1 6	12 8		2 30	13 1		2 22	10 2		2 48	10 6		2 33	11 0		3 2	11 4	27'2	
1 54	13 6		3 17	13 10		3 13	10 10		3 38	11 1		3 31	11 7		3 58	11 10	28'2	
1 40	14 3		4 3	14 7		4 2	11 5		4 26	11 8		4 24	12 1		4 49	12 4	●	
1 26	14 11		4 49	15 2		4 51	11 10		5 16	12 0		5 14	12 6		5 37	12 8	0'7	
1 14	15 4		5 39	15 4		5 41	12 1		6 6	12 2		6 2	12 9		6 20	12 10	1'7	
5 4	15 3		6 28	15 2		6 30	12 1		6 54	12 0		6 50	12 10		7 14	12 9	2'7	
5 53	14 11		7 19	14 7		7 18	11 10		7 42	11 8		7 38	12 8		8 2	12 7	3'7	
7 45	14 3		8 12	13 9		8 6	11 5		8 29	11 2		8 25	12 5		8 47	12 2	4'7	
3 39	13 3		9 7	12 10		8 53	10 11		9 18	10 7		9 9	11 10		9 32	11 7	5'7	
3 35	12 5		10 5	12 0		9 42	10 3		10 7	10 0		9 58	11 3		10 28	10 11	)	
3 39	11 10		11 14	11 8		10 38	9 10		11 12	9 8		11 0	10 8		11 32	10 6	7'7	
1 50	11 8		—	—		11 47	9 7		—	—		—	—		0 4	10 4	8'7	
3 24	11 8		0 57	11 9		0 22	9 7		0 58	9 8		0 35	10 4		1 8	10 4	9'7	
3 28	11 11		1 55	12 1		1 35	9 9		2 8	9 10		1 43	10 6		2 18	10 8	10'7	
3 21	12 4		2 47	12 7		2 37	10 0		3 5	10 3		2 50	10 10		3 20	11 0	11'7	
3 11	12 10		3 33	13 0		3 30	10 5		3 54	10 7		3 48	11 2		4 14	11 4	12'7	
3 54	13 3		4 15	13 5		4 17	10 9		4 38	10 10		4 39	11 5		5 1	11 6	13'7	
3 34	13 7		4 52	13 9		4 58	11 0		5 18	11 1		5 21	11 7		5 39	11 8	○	
3 10	13 10		5 28	13 10		5 37	11 1		5 55	11 1		5 57	11 9		6 15	11 9	15'7	
3 46	13 9		6 4	13 8		6 13	11 1		6 30	11 1		6 34	11 9		6 51	11 9	16'7	
3 20	13 7		6 37	13 5		6 46	11 0		7 3	10 11		7 8	11 9		7 24	11 9	17'7	
3 55	13 3		7 13	13 1		7 19	10 9		7 37	10 7		7 40	11 8		7 57	11 7	18'7	
3 32	12 11		7 51	12 8		7 55	10 6		8 12	10 4		8 14	11 6		8 30	11 4	19'7	
3 11	12 5		8 31	12 1		8 28	10 2		8 45	10 0		8 46	11 2		9 2	11 0	20'7	
at Spring } se.			7ft. 5in.			5ft. 10in.			6ft. 2in.									

## Equation of Time at Noon.

M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
0 52	Add.	9	7 33	Add.	17	3 45	Add.	25	0 13	Sub.			
0 29		10	7 5		18	3 16		26	0 43				
0 5		11	6 38		19	2 46		27	1 13				
9 41		12	6 10		20	2 16		28	1 42				
9 17		13	5 42		21	1 46		29	2 11				
8 51		14	5 13		22	1 17		30	2 41				
8 26		15	4 44		23	0 47		31	3 9				
7 59		16	4 15		24	0 17							

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 LWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 5 m.

TABLE (B).—For finding the Height of the Tide at any intermediate Hour between High and Low Water.

Height above Half-tide or Mean Level of the Sea.	Time from High Water.													
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
	0 00	0 30	1 00	1 30	2 00	2 30	3 00	3 30	4 00	4 30	5 00	5 30	6 00	6 30
	Add							Subtract						
Ft.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.
3	3 0	2 11	2 7	2 1	1 6	0 9	0 0	0 9	1 6	2 1	2 7	2 11	3 0	
4	4 0	3 10	3 6	2 10	2 0	1 0	0 0	1 0	2 0	2 10	3 6	3 10	4 0	
5	5 0	4 10	4 4	3 6	2 6	1 3	0 0	1 3	2 6	3 6	4 4	4 10	5 0	
6	6 0	5 10	5 2	4 3	3 0	1 7	0 0	1 7	3 0	4 3	5 2	5 10	6 0	
7	7 0	6 9	6 1	4 11	3 6	1 10	0 0	1 10	3 6	4 11	6 1	6 9	7 0	
8	8 0	7 9	6 11	5 8	4 0	2 1	0 0	2 1	4 0	5 8	6 11	7 9	8 0	
9	9 0	8 8	7 9	6 4	4 6	2 4	0 0	2 4	4 6	6 4	7 9	8 8	9 0	
10	10 0	9 8	8 8	7 1	5 0	2 7	0 0	2 7	5 0	7 1	8 8	9 8	10 0	
11	11 0	10 8	9 6	7 9	5 6	2 10	0 0	2 10	5 6	7 9	9 6	10 8	11 0	
12	12 0	11 7	10 5	8 6	6 0	3 1	0 0	3 1	6 0	8 6	10 5	11 7	12 0	
13	13 0	12 7	11 3	9 2	6 6	3 4	0 0	3 4	6 6	9 2	11 3	12 7	13 0	
14	14 0	13 6	12 1	9 11	7 0	3 7	0 0	3 7	7 0	9 11	12 1	13 6	14 0	
15	15 0	14 6	13 0	10 7	7 6	3 11	0 0	3 11	7 6	10 7	13 0	14 6	15 0	
16	16 0	15 5	13 10	11 4	8 0	4 2	0 0	4 2	8 0	11 4	13 10	15 5	16 0	
17	17 0	16 5	14 9	12 0	8 6	4 5	0 0	4 5	8 6	12 0	14 9	16 5	17 0	
18	18 0	17 5	15 7	12 9	9 0	4 8	0 0	4 8	9 0	12 9	15 7	17 5	18 0	
19	19 0	18 4	16 5	13 5	9 6	4 11	0 0	4 11	9 6	13 5	16 5	18 4	19 0	
20	20 0	19 4	17 4	14 2	10 0	5 2	0 0	5 2	10 0	14 2	17 4	19 4	20 0	
21	21 0	20 3	18 2	14 10	10 6	5 5	0 0	5 5	10 6	14 10	18 2	20 3	21 0	
22	22 0	21 3	19 1	15 7	11 0	5 8	0 0	5 8	11 0	15 7	19 1	21 3	22 0	
23	23 0	22 3	19 11	16 3	11 6	5 11	0 0	5 11	11 6	16 3	19 11	22 3	23 0	
24	24 0	23 2	20 9	17 0	12 0	6 2	0 0	6 2	12 0	17 0	20 9	23 2	24 0	

**RULE.**—To find the Height of the Tide above the zero of the tables at any intermediate Hour between *High and Low Water*.\*

The zero of the tables is the mean height of the low water of ordinary spring tides.

From the height in the tables, subtract the half mean spring range, the remainder will be the height above the half-tide or mean level

\* The mean interval of time between two consecutive high waters is about 12h. 25m., but for the mariner's purpose the duration of flood or ebb may be considered as 6 hours. There are occasional exceptions; at Portsmouth, for example, the flood runs 7 hours and the ebb 5 hours.

of the sea, with which enter Table (B.), and, under the time from high water, take out the corresponding correction, and, as directed, add it to, or subtract it from, the half mean spring range; the result will be the height of the tide at that time above zero or the low-water standard of the tables.

## EXAMPLE I.

Required the height of the tide above zero at Liverpool on March 12th, P.M., at 2 h. after high water.

Height of high water (by the tables)	-	-	-	Ft. in.
				22 0
Half mean spring range	-	-	-	13 0
<hr/>				
Height above the half-tide or mean level of the sea	=	9	0	
Half mean spring range	-	-	-	13 0
By table (B) 9 ft. 0 in. gives	-	-	-	+ 4 6
<hr/>				
Height of the tide above zero at 2 h. after high water	=	17	6	

## EXAMPLE II.

Required the height of the tide above zero, at Liverpool on March 20th, P.M., at 4 h. after high water.

Height of high water (by the tables)	.	.	.	Ft. in.
				27 4
Half mean spring range	-	-	-	13 0
<hr/>				
Height above the half-tide or mean level of the sea	=	14	4	
Half mean spring range	-	-	-	13 0
By table (B) 14 ft. 4 in. gives	-	-	-	- 7 2
<hr/>				
Height of the tide above zero at 4 h. after high water	=	5	10	

In some cases, however, between 5 and 6 h. from high water, the correction from table (B) will be greater than the half mean spring range; when such is the case, the tide at that time will have fallen *below* the zero of the tables by a quantity equal to the difference between the correction from table (B) and the half mean spring range.

## EXAMPLE III.

Required the level of the tide at Liverpool on March 20th, P.M. at  $5\frac{1}{2}$  h. after high water.

Height of high water (by the tables)	-	-	-	Ft. in.
				27 4
Half mean spring range	-	-	-	13 0
<hr/>				
Height above the half tide or mean level of the sea	=	14	4	
Half mean spring range	-	-	-	13 0
By table (B) 14 ft. 4 in. at $5\frac{1}{2}$ h. from high water	-	-	-	13 10
<hr/>				
Level of the tide <i>below</i> zero	-	-	-	0 10



As stated in the advertisement, the soundings in most charts are reduced to the same zero as these tables,—viz., the mean level of the low water of ordinary spring tides,—but should the soundings on any particular chart be reduced to a standard below that zero, there will, in that case, be a greater depth of water in the channel than is given in the tables, by a quantity equal to the difference between the half mean spring range and the half spring range of the chart, or in other words, the difference between the mean level of the low water of spring tides, and the low-water standard to which the soundings on the chart are reduced : for example—The soundings on the chart of Liverpool are reduced to a zero 15 ft. below the mean level of the sea, whereas, the mean spring range for that place, as shown in the result of two years' observations (1854 and 1855) of the Self-registering Tide Gauge at St. Georges Pier, being 26 ft. gives 13 ft. below the mean level of the sea ; consequently 2 ft. will have to be added to the results deduced from table (B.)

Thus, in Example I. On the chart of Liverpool 11 ft. being marked on the bar of the Victoria Channel, the actual depth over the bar at 2h. after high water would be 17 ft. 6 in. + 11 ft. 0 in. + 2ft. 0 in. = 30ft. 6 in.

#### CORRECTIONS FOR CERTAIN DOCKS, &c.\*

The depth at high water on the sills of the following Docks may be known, by applying to the standard high water heights given in the foregoing Tables the annexed correction according to the sign.

		Ft. in	
		—	2 0
<i>Falmouth</i> —Over the Sill of Graving Dock	- - -	-	2 0
(applied to the heights given for Holyhead.)			
<i>Devonport</i> —Over the Sill of Basin	- - -	+ 15	8
<i>H. M. Dockyard.</i> „ South Dock	- - -	+ 12	8
„ New Long Dock	- - -	+ 16	1
„ Old North Dock	- - -	+ 4	5
„ New North Dock	- - -	+ 4	8
„ <i>Keyham</i> „ Entrance to Lock	- - -	+ 18	2
„ Entrance to North Basin	- - -	+ 9	2
„ No. 1 Dock	- - -	+ 5	2
„ 2 „	- - -	+ 5	2
„ 3 „	- - -	+ 9	2
<i>Plymouth</i> —Great Western Docks, Millbay.			
Over the Sill of Floating Dock	- - -	+ 10	3
„ Graving Dock	- - -	+ 11	9
(applied to the heights given for Devonport.)			
<i>Portsmouth</i> —Over the Sill of No. 1 or South Dock	- - -	+ 6	8
<i>H. M. Dockyard.</i> „ Entrance	} Basin Dock	+ 13	4
„ No. 2		+ 10	4
„ 3		+ 12	5
„ 4		+ 13	0
„ 5		+ 6	10

\* As it is desirable that the information here given should be accurate and complete, it is requested that corrections and additions be forwarded to the Secretary of the Admiralty.

<b>Portsmouth</b> —Over the Sill of No. 6 or North Deck	-	+	6	4
<b>H. M. Dockyard.</b> „ Entrance	} Steam Basin	-	+ 12	2
„ „ No. 7		-	+ 12	2
„ „ 8		-	+ 9	1
„ „ 9 at N. end of Slips		-	+ 8	1
„ „ 10 South „	-	+	14	2
<b>Sheerness</b> —Over the Invert at the	} Great Basin -	-	+ 9	8
<b>H. M. Dockyard.</b> entrance -		-	+ 9	2
„ Sill of No. 1 Dock		-	+ 9	2
„ „ 2 „		-	+ 9	2
„ „ 3 „		-	+ 9	2
„ „ No. 4 Dock	} Boat Basin -	-	+ 3	10
„ „ 5 „		-	- 1	4
<b>Chatham</b> —Over the Sill of No. 1 Dock	-	-	- 3	11
<b>H. M. Dockyard.</b> „ 2 „	-	+	3	5
„ „ 3 „	-	+	3	4
„ „ 4 „	-	+	0	5
(applied to the Heights given for London.)				
<b>Woolwich</b> —Over the Sill at the entrance of Outer Basin	-	+	3	7
<b>H. M. Dockyard.</b> „ Inner Basin	-	+	1	10
„ „ No. 1 Dock	-	+	2	10
„ „ 2 „	-	+	1	10
„ „ 3 „	-	+	1	10
(applied to the heights given for London.)				
<b>Deptford</b> —Over the Sill of Outer Dock	-	-	- 4	2
<b>H. M. Dockyard.</b> „ Inner Dock	-	-	- 6	2
(applied to the Heights given for London.)				
<b>London</b> —Over the Sill of St. Katherine Dock	-	+	8	9
„ London Dock, Hermitage Entr.	-	+	0	10
„ „ Wapping „	-	+	3	9
„ „ Shadwell, Upper	-	+	6	2
„ „ „ Lower	-	+	8	10
„ Grand Surrey Dock	-	+	7	10
„ Surrey Canal and Dock	-	-	0	2
„ New Commercial Dock, Upper	} -	-	1	3
„ Entrance		-	-	-
„ Regents Canal and Dock	-	-	0	8
„ West India Dock, Limehouse	} +	3	10	
„ Entrance		-	-	-
„ City Canal or South West India	} +	4	4	
„ Dock, Limehouse		-	-	-
„ Commercial Dock, Upper, Lime-	} -	0	8	
„ house Reach		-	-	-
„ „ „ Lower „	-	+	7	10
„ City Canal or South West India	} +	4	7	
„ Dock, Blackwall		-	-	-
„ West India Dock, Blackwall	-	+	3	11
„ East India Dock „	-	+	5	4
„ Victoria London Dock „	-	+	8	10
<b>Hull</b> —Over the Sill of Humber Dock	-	+	4	3
<b>Middlesbrough</b> —Over the Sill of the Dock	-	+	4	1
(applied to the Heights given for Sunderland.)				
<b>Hartlepool</b> —Over the Sills of Victoria, West or Coal Dock,	} +	6	8	
„ Swainston and Jackson Docks		-	-	-
(applied to the Heights given for Sunderland.)				



<i>Liverpool</i> —continued :			Ft.	in.
Over the Sill of Brunswick Dock, North Passage	-	-	1	9
" " Half-tide Dock, East Passage	-	-	2	9
" " " " West Entrance	-	-	2	3
" Toxteth Dock, West Entrance	-	-	3	3
" Harrington Dock, West Entrance	-	-	7	1
" Garston Dock	-	-	2	3
" River Craft Dock, Lock, and Eagle Basin, }			8	6
Outer Gates }				
" " " " Inner " "	-	-	9	6
" Duke of Bridgewater's Dock, Outer Gates	-	-	3	9
" " " " Middle " "	-	-	8	9
" " " " Inner " "	-	-	2	3
" Canada Lock and Graving Dock	-	-	0	6
" Huskisson Lock and Graving Dock	-	-	1	9
" Sandon Graving Docks, Nos. 1 to 5, East	-	-	4	9
" " " " No. 6, West	-	-	4	9
" Canning Graving Docks, No. 1	-	-	10	0
" " " " No. 2	-	-	8	3
" Queens Graving Docks, No. 1	-	-	6	7
" " " " No. 2	-	-	4	9
" Brunswick Graving Docks, No. 1	-	-	5	9
" " " " No. 2	-	-	5	9
<i>Birkenhead</i> —				
Over the Sill of Morpeth Dock from Morpeth Basin	-	-	3	3
" Sills of Caisson between Egerton and Morpeth Docks	-	-	0	9
" Sill of Reverse Gate	-	-	2	9
" Sills of Caisson between Egerton Dock and Great Float	-	-	0	9
" " " " East and West Floats	-	-	0	9
(applied to the heights given for Liverpool.)				
<i>Dublin</i> —				
Over the Sill of North Wall Graving Dock	-	-	+	6 0
" Old Custom House Dock	-	-	+	3 5
" Georges Dock	-	-	+	5 5
" Camden Lock of Grand Canal Dock	-	-	+	7 0
(applied to the heights given for Kingstown.)				
<i>Londonderry</i> —				
Over the Sill of Graving Dock	-	-	-	+ 7 4

## TIDAL CONSTANTS

FOR

## VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

THE following table contains Tidal Constants for several places on the coasts of the United Kingdom and of Europe, which, being applied according to the sign + or - to the times or heights belonging to the standard port to which each of them is referred, will afford a ready means of determining approximately the height as well as the time of high water at each of those several places.

[NOTE.] In the tables from 1850-1858 the Constants for the height were given for such places only where the curves for the place and the standard port were similar, the Constant being the difference between the whole rise at the two places. But as that arrangement, which at times referred necessarily to a standard port on a distant part of the coast, appears to have confused the mariner, he is now referred to the standard port in the locality of the required place, which although the result deduced thereby may not be strictly accurate, yet it is sufficiently near for practical purposes.

COAST OF IRELAND.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Skull . . . . .	— 0 59	— 2 1	Queenstown.
Crookhaven . . . . .	— 0 52	..	"
Dunmanus Harbour . . . . .	— 1 4	— 2 4	"
Dunbeacon, Dunmanus Bay . . . . .	— 1 10	— 1 7	"
Black Ball Harbour . . . . .	— 1 21	— 2 3	"
Castletown, Bearhaven . . . . .	— 0 47	— 2 0	"
Bantry Harbour . . . . .	— 1 14	— 1 7	"
West Cove, Kenmare River . . . . .	— 1 9	— 1 9	"
Valentia Harbour . . . . .	— 1 19	— 0 8	"
Limerick, R. Shannon . . . . .	+ 1 45	+ 1 9	Galway.
Mellon . . . . .	+ 1 26	..	"
Foynes Island . . . . .	+ 1 0	+ 0 7	"
Tarbert . . . . .	+ 0 22	— 0 7	"
Kilrush . . . . .	+ 0 7	..	"
Carrigaholt . . . . .	+ 0 9	..	"
Kilbaha . . . . .	— 0 19	— 1 9	"
Roundstone . . . . .	— 0 50	+ 1 9	Sligo.
Inishbofin . . . . .	— 0 44	+ 0 4	"
Westport . . . . .	— 0 21	+ 1 1	"
Achillbeg . . . . .	— 0 4	— 0 6	"
Blacksod Bay (Quay) . . . . .	— 0 31	..	"
Broadhaven Harbour . . . . .	— 0 18	— 0 9	"
Donegal Harbour, (Salthill Quay) . . . . .	+ 0 5	..	"
Killybegs . . . . .	+ 0 13	..	"
Lough Rossmore . . . . .	+ 0 19	..	"
Gweedore Bay (Bunbeg) . . . . .	+ 0 14	— 0 6	"
Sheephaven . . . . .	+ 0 7	+ 0 7	"
Rathmullan, Lough Swilly . . . . .	+ 0 24	..	"
Coleraine . . . . .	— 1 37	— 1 6	Londonderry.
Port Rush . . . . .	— 1 53	— 2 6	"
Ballycastle Bay . . . . .	— 4 18	..	Belfast.
Lough Larne . . . . .	— 0 13	..	"
Donaghadee . . . . .	+ 0 3	+ 0 3	Kingstown.
Lough Strangford (Killard Point) . . . . .	— 0 17	..	"
" Strangford Quay . . . . .	+ 1 21	..	"
" Carlingford (Bar or Cranfield Point) . . . . .	— 0 10	..	"
Warrenpoint . . . . .	0 0	+ 3 1	"
Howth . . . . .	— 0 1	..	"
Dublin Bar . . . . .	+ 0 2	..	"
Wicklow . . . . .	— 0 41	..	"
Arklow . . . . .	— 2 25	..	"
Wexford . . . . .	+ 2 1	— 7 4	Waterford.
New Ross . . . . .	+ 0 44	+ 0 1	"
Waterford Bridge . . . . .	+ 0 46	+ 1 0	"
Dunmore . . . . .	+ 0 7	— 0 2	"
Ballinacourty, Dungarvan . . . . .	— 0 8	0 0	"
Youghal . . . . .	— 0 6	+ 0 3	"
Ballycotton . . . . .	— 0 26	— 0 5	"
Kinsale . . . . .	— 0 18	— 0 4	Queenstown.
Courtmacsherry . . . . .	— 0 25	— 1 1	"
Castletownsend . . . . .	— 0 40	— 1 0	"
Baltimore . . . . .	— 0 38	..	"

ISLANDS OF GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Island . . . . .	— 2 10	..	Weston-super-mare.
ow . . . . .	— 1 41	..	"
Island . . . . .	— 1 39	..	"
apple Bar . . . . .	— 1 24	..	"
ombe . . . . .	— 1 12	..	"
ewater Bar . . . . .	— 0 4	..	"
head . . . . .	+ 0 22	..	"
l (King Road) . . . . .	+ 0 2	..	"
f. . . . .	+ 0 5	..	"
ea (Mumbles Lighthouse)	— 0 11	..	Pembroke.
ly . . . . .	+ 0 4	..	"
. . . . .	— 0 12	..	"
d Haven (entrance) . . . . .	— 0 20	..	"
ard, Goodie Pier . . . . .	— 3 15	— 4 5	Holyhead.
gan . . . . .	— 3 10	..	"
stwyth . . . . .	— 2 40	— 3 0	"
ovey . . . . .	— 2 11	..	"
outh . . . . .	— 2 31	..	"
eli . . . . .	— 2 25	..	"
ey Island . . . . .	— 2 31	..	"
dyn-lleyn . . . . .	— 1 41	..	"
arvon . . . . .	— 0 38	— 2 3	"
aris . . . . .	— 0 51	— 4 7	Liverpool.
etwood (Wyre Lighthouse)	— 0 12	..	"
on-le-Sands . . . . .	+ 0 3	+ 1 3	"
haven . . . . .	— 0 9	— 2 9	"
es Head and Port Har- } ton . . . . . }	— 0 18	..	"
ington . . . . .	— 0 19	..	"
port . . . . .	— 0 20	..	"
r Head . . . . .	— 0 13	..	"
erness . . . . .	— 0 3	..	"
Foot . . . . .	+ 0 33	..	"
Carlisle . . . . .	+ 0 47	..	"
as, Isle of Man . . . . .	+ 1 1	..	Holyhead.
ey " . . . . .	+ 1 1	+ 3 3	"
" " . . . . .	+ 0 57	+ 0 3	"
Point, Solway Firth . . . . .	— 0 1	— 2 11	Liverpool.
Patrick . . . . .	— 0 58	..	Greenock.
Ryan . . . . .	— 0 56	..	"
ish . . . . .	— 0 19	..	"
bellton . . . . .	— 0 23	..	"
. . . . .	— 0 18	— 1 0	"
ssan . . . . .	— 0 23	..	"
. . . . .	— 0 18	..	"
ry . . . . .	— 0 2	..	"
Glasgow . . . . .	+ 0 10	..	"
ow . . . . .	+ 1 17	..	"
. . . . .	+ 4 41	..	"
mory, Isle of Mull . . . . .	— 2 52	..	Taunso.
ae, Isle of Skye . . . . .	— 1 56	..	"
Inver . . . . .	— 1 47	..	"
Akin . . . . .	— 2 12	..	"
a, Summer Isles . . . . .	— 1 51	..	"
oway, Isle of Lewis . . . . .	— 1 42	..	"
Wrath . . . . .	— 0 58	..	"

PORTS OF GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Stromness . . . . .	+ 0 32	..	Thurso.
Lerwick . . . . .	+ 2 2	..	"
Wick . . . . .	- 2 55	..	Leith.
Dornock Road . . . . .	- 2 17	..	"
Cromarty . . . . .	- 2 21	..	"
Inverness . . . . .	- 1 59	..	"
Banff . . . . .	- 1 49	..	"
Peterhead . . . . .	- 1 43	..	"
Aberdeen . . . . .	- 1 17	..	"
Stonehaven . . . . .	- 1 7	..	"
Montrose . . . . .	- 0 52	..	"
Arbroath . . . . .	- 0 42	..	"
Tay Bar . . . . .	- 0 11	..	"
Broughty Ferry . . . . .	+ 0 5	..	"
Dundee . . . . .	- 0 50	+ 0 2	Sunderland.
Dunbar . . . . .	- 1 14	0 0	"
Berwick . . . . .	- 1 4	..	"
Holy Island . . . . .	- 0 52	..	"
Blyth . . . . .	- 0 7	..	"
Tynemouth Bar . . . . .	- 0 2	..	"
Seaham . . . . .	+ 0 2	..	"
Hartlepool . . . . .	+ 0 6	+ 0 8	"
Whitby . . . . .	+ 0 23	..	"
Scarborough . . . . .	+ 0 49	+ 1 5	"
Filey Bay . . . . .	+ 0 58	..	"
Flamborough Head . . . . .	- 1 59	..	Hull.
Bridlington . . . . .	- 1 50	..	"
Spurn Point . . . . .	- 1 3	..	"
Great Grimsby . . . . .	- 0 53	- 1 8	"
Lynn and Boston Deep . . . . .	- 0 29	..	"
Wells Bar . . . . .	- 0 9	..	"
" Harbour . . . . .	+ 0 31	..	"
Blakeney Bar . . . . .	+ 0 1	..	"
Yarmouth Road . . . . .	- 2 51	..	Harwich.
Lowestoft . . . . .	- 2 9	..	"
Orfordness . . . . .	- 0 51	..	"
Nore . . . . .	- 0 7	..	Sheerness.
Chatham . . . . .	+ 0 25	..	"
Gravesend . . . . .	- 0 57	..	London.
Woolwich . . . . .	- 0 28	..	"
Greenwich . . . . .	- 0 24	..	"
London Docks . . . . .	- 0 10	+ 0 4	"
Margate . . . . .	- 2 27	..	"
Ramsgate . . . . .	- 2 23	- 4 1	"
Deal . . . . .	+ 0 3	..	Dover.
Folkstone . . . . .	- 0 5	..	"
Dungeness . . . . .	- 0 27	..	"
Rye Bay . . . . .	+ 0 8	..	"
Hastings . . . . .	- 0 19	..	"
Beachy Head . . . . .	+ 0 8	..	"
Newhaven . . . . .	+ 0 39	..	"
Shoreham . . . . .	+ 0 23	- 1 2	"
Littlehampton . . . . .	- 0 5	..	Portsmouth.
Selsea Bill . . . . .	+ 0 4	..	"
Bembridge Point . . . . .	- 0 41	..	"

GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
m . . . . .	— 1 11	..	Portsmouth.
s . . . . .	— 0 56	..	"
ber . . . . .	— 1 41	..	"
int . . . . .	— 1 55	..	"
h . . . . .	— 2 41	..	"
. . . . .	— 2 31	..	"
reakwater . . . . .	— 4 40	— 5 10	"
s . . . . .	+ 0 38	..	Devonport.
. . . . .	+ 0 38	..	"
. . . . .	+ 0 17	..	"
. . . . .	+ 0 33	..	"
breakwater . . . . .	— 0 6	..	"
. . . . .	— 0 17	..	"
. . . . .	— 0 29	..	"
. . . . .	— 0 46	..	"
. . . . .	— 1 13	..	"
(St. Mary) . . . . .	— 1 16	..	"

## WESTERN COAST OF EUROPE.

. . . . .	— 1 27	..	Brest.
. . . . .	— 2 2	..	"
r) . . . . .	— 1 17	..	"
. . . . .	— 1 17	..	"
. . . . .	— 0 47	..	"
. . . . .	— 0 17	..	"
. . . . .	— 0 2	..	"
. . . . .	+ 0 50	..	"
rdouan . . . . .	— 0 10	..	"
. . . . .	+ 3 3	..	"
. . . . .	— 0 27	..	"
. . . . .	— 0 41	..	"
moutier . . . . .	— 0 45	..	"
o . . . . .	— 0 5	..	"
. . . . .	— 0 7	..	"
. . . . .	— 0 29	..	"
. . . . .	— 0 36	..	"
rneau . . . . .	— 0 35	..	"
. . . . .	— 0 26	— 1 9	"
Ushant) . . . . .	— 0 15	— 0 1	"

## NORTHERN COAST OF EUROPE.

. . . . .	+ 0 27	..	Brest.
. . . . .	+ 1 6	..	"
n . . . . .	+ 1 30	..	"
. . . . .	+ 2 4	..	"
. . . . .	+ 2 18	..	"
. . . . .	+ 2 26	..	"
usey . . . . .	+ 2 22	..	"
Helier) . . . . .	+ 2 38	..	"
St. Peter Port) . . . . .	+ 2 50	..	"
. . . . .	+ 2 45	..	"



NORTHERN COAST OF EUROPE.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Alderney . . . . .	+ 2 59	..	Brest.
Cherbourg . . . . .	+ 4 2	..	"
Barfleur . . . . .	+ 5 4	..	"
La Hougue . . . . .	+ 4 55	..	"
Honfleur . . . . .	+ 5 42	+ 4 3	"
Quillebœuf . . . . .	+ 6 19	- 9 7	"
Havre . . . . .	+ 6 4	..	"
Fécamp . . . . .	+ 6 57	+ 4 2	"
Dieppe . . . . .	+ 7 19	..	"
Cayeux . . . . .	+ 7 18	..	"
Boulogne . . . . .	+ 0 13	..	Dover.
Cape Grisnez . . . . .	+ 0 15	+ 2 4	"
Calais . . . . .	+ 0 37	+ 0 10	"
Dunkerque . . . . .	+ 0 56	..	"
Nieuport . . . . .	+ 1 6	..	"
Ostend . . . . .	+ 1 13	..	"
Flushing . . . . .	+ 2 8	..	"
Antwerp . . . . .	+ 5 13	..	"
Hellevoetsluis . . . . .	+ 3 18	..	"
Rotterdam . . . . .	+ 4 33	..	"
Helgoland . . . . .	- 0 33	- 2 10	Harwich.

#### SET OF THE TIDES ALONG THE SOUTH COAST OF ENGLAND.

The tides about Plymouth Sound are tolerably regular, both flood and ebb, generally running each way about six hours and ten minutes at a mean. In Hamoaze the flood stream continues to run up, on spring tides, about fifteen minutes after high water at Devonport Dock-Yard.

It is high water in Catwater rather earlier than at the Dock-Yard; but with strong winds from the southward and westward the tide flows half an hour longer in both harbours.

At the Breakwater in Plymouth Sound it is high water a few minutes earlier than at the Dock-Yard, but the stream drains in for a short time after the water has ceased to rise.

Abreast of Plymouth Sound, about 6 miles from the land, the streams are very irregular and do not turn with the tide farther out in the offing. One hour and three-quarters before high water at the Dock-Yard the stream makes to the eastward and runs about E. by S. for one hour; during the next hour it is scarcely sensible, after which it turns to the southward, gradually changing to W.S.W. till the last quarter of the ebb on the shore, when it veers from W.S.W. to W.N.W. During the first 3 hours flood on the shore, its direction changes from W.N.W. to N.W., when it begins to slacken, and to set about North, till at the last  $4\frac{1}{2}$  hours flood it runs E. by S. as at first.

Four miles south-west of the Eddystone the stream begins to run E. by S. when it is high water at the Dock-Yard, and continues about two hours and three-quarters, when it slackens and shifts to the southward. At  $3\frac{1}{4}$  hours ebb on the shore it sets W.S.W.; at 4 hours W. by N.; and then W.N.W. until low water. During the first 2 hours flood on the shore the stream sets N.W. by W., and loses its strength during the third hour, running N.W. and North. During the fourth hour, what little stream there is sets N.N.E. and N.E.; and then E.N.E. and E. by N. till about high water, when its direction is E. by S.

From Bolt Tail to Start Point, at 4 miles off shore, the eastern stream makes at 3 hours after high water, and the western stream 3 hours after low water on the shore; the stream sets along the land, and its greatest velocity is  $2\frac{1}{4}$  knots. At neaps the turn of the stream is regular, varying from 4 to 7 hours after high and low water on the shore, the average being 5 hours. Its rate at neaps is  $1\frac{1}{2}$  knots: off Start  $2\frac{1}{2}$  knots.

Off Exmouth Bar, at three quarters of a mile, south of Straight Point, full and change, the stream turns to the eastward at 3h. 40m. and to the westward at 11h. 0m., running in the latter direction about  $4\frac{1}{4}$  hours. The direction of the western stream for the first 2 hours is S.W.; for the next 2 hours west, and then turns gradually to the northward. The direction of the eastern stream for the first quarter is N.E.; at half-tide, E. by N.; and the greatest velocity of both streams is about 1 knot.

Three miles south of Beer Head, the stream turns to the westward at 1h. 30m., and runs in that direction 4 hours, then gradually turns to the northward and runs for 2 hours between W.N.W. and N.E. by N. It may be said to turn to the eastward about 5 o'clock, and for  $2\frac{1}{2}$  hours, until half tide, sets from N.E. to E. by N., and for the next 3 hours gradually turns to the southward. The direction of the tide in this position is, therefore, round the compass, with little or no velocity, as even springs it scarcely runs a knot, and that only for a very short period.

In West Bay, at 2 miles N.N.W. of the Bill of Portland, at full and change, the tide begins to turn at 6h. 35m. and sets as follows: 1st hour of the ebb by the shore, at Portland Breakwater, S.  $\frac{1}{2}$  E.,  $1\frac{1}{2}$  knots. 2d hour, S.  $\frac{1}{2}$  W.,  $1\frac{3}{4}$  knots. 3d hour, S. by W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  knots. 4th hour, S.W. by S., three quarters of a knot. 5th hour, N.W.  $\frac{1}{4}$  N., nil. 6th hour, from N.N.W. to N.  $\frac{1}{2}$  W., three quarters of a knot. 7th hour, N.E. to E. by N., 1 knot. 8th hour, S.E.  $\frac{1}{4}$  E.,  $1\frac{1}{4}$  knots. 1st hour of the flood, S.E. by S.,  $1\frac{1}{2}$  knots. 2d, 3d, 4th, and 5th hours, S.S.E., 2 knots.

At  $2\frac{1}{4}$  miles S.E.  $\frac{1}{2}$  S. of the Bill of Portland, near the west end of the Shambles, the 1st hour of the flood by the shore sets west, at the rate of  $1\frac{1}{4}$  to half a knot. 2d hour, E.  $\frac{1}{2}$  N., half a knot. 3d hour, E. by N.,  $2\frac{3}{4}$  knots. 4th hour, E.N.E.  $\frac{3}{4}$  E.,  $3\frac{3}{4}$  knots. 5th hour, east,  $3\frac{1}{2}$  knots. At the 1st hour of the ebb, E. by S.,  $3\frac{1}{2}$  knots. 2d hour, E. by S. to S.E. by S.,  $2\frac{1}{2}$  to  $1\frac{1}{2}$  knots. 3d hour, south, 1 knot. 4th hour, S.W. by S.,  $1\frac{1}{2}$  knots. 5th hour, W.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  knots. 6th hour, W. by S., 2 knots. 7th hour, W. by S.,  $2\frac{1}{4}$  knots. 8th hour, W.S.W.  $\frac{3}{4}$  W.,  $1\frac{3}{4}$  knots. N.B.—About a mile south of the Bill, at half flood, by the shore, the tide sets from S.S.E. to S.E.  $\frac{1}{2}$  E., and the opposite stream about W.S.W.  $\frac{1}{2}$  W.: the velocity of both streams, at springs, is from 5 to 6 knots; but although the tide runs with such violence near the Race, about a mile S.W. of the Bill the tide was found very weak.

At 5 miles E.S.E. of the Bill of Portland, near the east end of the Shambles, the 1st hour of the flood by the shore sets west,  $1\frac{1}{2}$  knots. 2d hour, from West to N. by E., very weak. 3d hour about E.N.E., very weak. 4th hour, E. by N., 2 knots. 5th hour, E. by N.,  $2\frac{3}{4}$  knots. At the 1st hour of the ebb sets E.N.E.,  $3\frac{1}{2}$  knots. 2d hour, E.N.E.,  $3\frac{1}{4}$  knots. 3d hour, east,  $2\frac{3}{4}$  knots. 4th hour, east and E. by N.,  $1\frac{1}{4}$  knots. 5th, east, N. by W., and W. by N., very weak. 6th, 7th, and 8th, about west, from  $2\frac{3}{4}$  to  $2\frac{1}{4}$  knots.

In Portland and Weymouth Roads there is very little tide, so that the stream is scarcely sensible, and continues to be very moderate along the shore from Weymouth to St. Albans Head.

S.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{4}$  miles from St. Albans Head, the western stream, at full and change, makes at 10h. 45m., and the eastern stream at 11h. 45m.: the flood and ebb are of equal duration, the former setting S.E., and the latter from W.N.W. to N.W. by W.; their greatest velocity being at half tide from  $4\frac{1}{2}$  to  $4\frac{3}{4}$  knots.

At 1 mile S.E. of Durlstone Head, at full and change, the western stream makes at 10h. 25m., and the eastern stream at 4h. 25m., the former setting W.S.W., and the latter E.N.E.; their greatest velocity being about 3 knots: the indraught of the flood stream in thick weather might prove fatal to a ship not on her guard.

At a third of a mile E.S.E. of Peverel Point, at full and change, the western stream makes at 8h. 40m., and the eastern stream at 4h. 0m., the former setting S.W. and the latter N.E.; on the ebb there is a dangerous race over the Ledge, which extends about a mile off the Point. The velocity of the ebb stream is about 3 knots, and that of the flood about  $1\frac{1}{2}$  knots. Off Old Harry at three quarters of a mile N.E. by E. of Standfast Point, at full and change, the western stream makes at 9h. 45m., and the flood or eastern stream at 4h. 10m., the flood setting from N.E. by E. to N. by E. at the rate of 1 knot, and the ebb from S. by W. to S.W. 2 knots.

At the Needles, at full and change, the western stream makes at 10h. 0m., and the flood or eastern stream at 3h. 40m., and the velocity of both streams over the Bridge and in the South Channel is from 3 to 4 knots; but between Hurst Point and the Island,  $5\frac{1}{2}$  knots, and to the southward of the Bridge about 2 knots. In the Solent, the eastern or flood stream makes at 4h., and near the Bramble at 4h. 30m.\*

In Freshwater Bay, about 1 mile S.W. of Brook Point, and the same distance off Atherfield Point, at full and change, the western stream makes at 10h. 25m., and runs at the rate of 1 knot, and the flood or eastern stream at 2h. 35m. from 2 to  $2\frac{3}{4}$  knots; both streams take the direction of the coast. W. by S.  $4\frac{1}{2}$  miles from St. Catherine Point, the western stream makes at 11h., setting N.W.  $\frac{3}{4}$  W. and the flood or eastern stream at 5h., in the opposite direction S.E.  $\frac{3}{4}$  E., the rate of both being from 2 to 4 knots; but at 1 mile W. by S. from the Point the streams set N.W. by N. and S.E. by S., 3 to 4 knots, and at two thirds of a mile S.S.W. of the Point, W. by N. and E. by S., with the same velocity.

Nearly 5 miles S.S.E. of Dunnose, at full and change, the stream turns at 10h. 40m. and 4h. 30m. and sets E.  $\frac{1}{2}$  S. and W. by N.; velocity, from 4 to 5 knots; but S.E., 2 miles from Dunnose, the flood sets E. by N., and turns at the same time as in Portsmouth Harbour, and the ebb W. by S., but one hour earlier than it does in the harbour.

Princessa. At the N.W. buoy, at full and change, the western stream makes at 10 o'clock, and runs 6 hours W.S.W.  $\frac{1}{2}$  W. The eastern stream commences at 4 o'clock, and sets very nearly in the opposite direction, E.N.E. At the S.E. buoy the tides are about half an hour later, and set as follows; viz., the western stream, first part W.  $\frac{3}{4}$  S., gradually becomes more southerly, and at the last of the tide runs S.W. by S. The course of the eastern stream is pretty nearly the same throughout the whole of the tide, E. by N.

At the Nab Light Vessel, the tidal stream is nearly rotary, which is probably caused by the Spithead tide meeting the tide round Dunnose

\* In the Solent, and as far to the westward as Portland, there are what are termed the *first* and *second* high waters. This double high water is probably caused by the tidal stream at Spithead, for, as long as that stream runs strong to the westward the tide is kept up in Southampton water, and there is no fall of consequence until the stream begins to slack at Spithead, but when the stream makes to the eastward at Spithead the water falls rapidly at Southampton. After low water, the tide rises there pretty steadily for 7 hours, which may be considered as the *first* or proper high water; it then ebbs for an hour about 9 inches, at the end of which time it again commences to rise, and in about  $1\frac{1}{4}$  hours reaches its former level, and sometime higher; this is called the *second* high water. To the mariner, the knowledge that the high water at Southampton remains nearly stationary for rather more than 2 hours may, in some cases, be important. Similar *first* and *second* high water occur on either shore of the Solent, as shown in the times of high water at full and change, page 149.

At Havre, on the French coast, the high water remains stationary for one hour with a rise and fall of 3 or 4 inches for another hour, and only rises and falls 18 inches for the space of 3 hours; this long period of nearly slack water is very valuable to the traffic of the port, and allows from 15 to 16 vessels to enter or leave the dock on the same tide.

somewhere near the Light Vessel; for instance, at the 1st hour's flood by the shore it sets East; 2d and 3d hours, E.N.E.; 4th, N.E.; 5th, N.E. by N.; 6th, North; 7th, N.N.W. to N.W.; and the last drain of the flood, N.W. by W. The 1st hour's ebb sets W. by N.; 2d W. by S. to W.S.W.; 3d, S.W. by W. to S.W.; 4th, S.W.  $\frac{1}{2}$  S., the first part of the 5th hour, S.S.W., gradually trending to the southward until low water by the shore, when it sets S.E. There are only a few minutes slack. At full and change, the eastern stream makes at 8h. 30m., and the western stream at 12h. 15m.

At the Warner, at full and change, the eastern stream makes at 2 o'clock, and runs  $7\frac{1}{2}$  hours about S.S.E.; and the western stream at 9h. 30m., and runs nearly  $4\frac{1}{2}$  hours N.N.W.

Near the Horse Elbow, the tide must be strictly attended to, for in many cases it sets directly over that shoal. The eastern stream makes at 2 o'clock,  $2\frac{1}{2}$  hours after the tide on the shore, and runs to the S.E.  $7\frac{1}{2}$  hours; the western stream makes at 9h. 15m.,  $4\frac{1}{2}$  hours after low water on the shore, and runs nearly 5 hours to the N.W.

At the Dean Elbow, at full and change, the eastern stream, which sets over that shoal, makes at 2 o'clock, runs to the S.E. for 2 hours, and then sets east for the remainder of the tide,  $5\frac{1}{2}$  hours; the western stream makes at 9h. 45m., and runs W.N.W.  $4\frac{1}{2}$  hours.

At Spithead, at full and change, the eastern stream makes about 2 o'clock,  $2\frac{1}{2}$  hours after high water in the harbour, and runs 7 hours S.E. by S.; and the western stream about 9 o'clock,  $2\frac{1}{2}$  hours before high water in the harbour, and runs 5 hours N.W. by N.

In Portsmouth Harbour the flowing continues about seven hours, and a narrow stream runs in, fifteen or twenty minutes after high water at the Dock-Yard. From the result of three years' observations taken at the Dock-Yard it appears that at high water, slack water at springs continues for eight minutes, and at neaps sixteen minutes.

**Looe Stream.** At the western entrance near the Pullar Buoy, at full and change, the eastern stream makes at 3h. 45m., and the western stream at 10 hours, and sets S.E. and N.W. Between 2 and 3 miles outside of the Boulder Bank, the stream turns about an hour later; the eastern stream setting E.S.E. and the western stream west. Between the Pullar Bank and the Middle Owers, the eastern stream sets E.S.E. and the western stream west. At the eastern entrance, near East-borough Head, the eastern stream makes at 4h. 30m., and sets E.N.E.  $\frac{1}{2}$  E., and the western stream at 9h. 50m. west. Off the west end of the Hooe Bank, the eastern stream makes at 4h. 35m., and sets E.S.E., and the western stream at 10h. 30m. W.  $\frac{3}{4}$  N.

About 1 mile S.S.E. of the South Foreland Lighthouse, the stream begins to set to the eastward about 1h. 30m. before high water on the shore at Dover, and runs from N.E. by E. to E.N.E. about  $5\frac{1}{2}$  hours, or till 4 hours after high water: it then turns and sets W.S.W.  $\frac{1}{2}$  W. about 7 hours. At Dover the flowing stream very seldom continues more than 5 hours, and sometimes scarcely so much; it is nearly the same at Ramsgate. To the northward of the South Foreland the streams change their direction to N.E.  $\frac{1}{2}$  N. and S.W.  $\frac{1}{2}$  S.

In the Downs the north-eastern stream begins about 1h. 20m. before high water at Dover, and continues to run 5h. 30m.: it then turns and runs in a contrary direction till 2 hours before the ensuing high water.\*

In the Gull Stream, 1 mile N.N.W. from the Bunthead, the northern stream begins about 1h. 10m. before high water at Dover, and continues for 6 hours: it then turns and runs in a contrary direction till  $1\frac{1}{2}$  hours before the ensuing high water. Its direction is N.E.  $\frac{3}{4}$  N.; but the last hour changes to E.N.E., and even to the southward of East; the last hour of the southern stream changes from S.W.  $\frac{3}{4}$  S. to W.S.W., and even to the northward of West.

\* For the tides at the Southsand Head and Northsand Head of the Goodwin, see Compartment VI.

## TIDES ON THE EAST COAST OF SCOTLAND AND ENGLAND.

In the North Sea the flood tide-wave enters from the Atlantic Ocean between the coast of Norway and the British Isles, and passes through the various channels formed by the Shetlands, the Orkneys, and the north point of Scotland. The average rate of the stream in the offing is very moderate, not exceeding a knot and a half; but that part of the stream which enters by the Pentland Firth acquires a furious rapidity, amounting at spring tides even to eight knots. Immediately on quitting the Firth, however, it abates in strength, as it diverges into open water; its eastern branch filling up the basin of the North Sea as it advances towards the coast of Jutland and Holland; whilst its western branch, more or less confined by the Dogger and other outlying banks, swells along the shores of Scotland and England, and makes high water in all their rivers and harbours successively till it arrives in the Thames.

The following remarks will assist the seaman in tracing the movement of the tide stream along the coast :—

Off Clythness and Ord Head its rate is about 3 knots at the springs and  $1\frac{1}{2}$  with the neaps, and continues to run to the southward till 11 o'clock, or till 3h. 40m. before high water at Leith. Off Covesca Point, Burgh Head, and thence westward towards Fort George and Cromarty, it runs about an hour longer.

Off Cullen the flood stream sets slowly to the eastward, increasing in velocity as it advances: off Troop Head it runs till 1 o'clock, or till 1h. 20m. before high water at Leith; off Kinnaird Head it attains the rate of 2 knots on springs, and is still accelerated as it passes Rattray Brigs till off Peterhead, which is occasioned by the junction of the direct stream from Duncansby Head. Six miles off Kinnaird Head the stream runs to the southward till 2, and at 12 miles till 3 o'clock, or till 40 minutes after high water at Leith.

Off Buchanness the stream attains its greatest strength, namely 4 knots on the springs, and  $2\frac{1}{2}$  on the neaps; but off Newburgh it decreases to less than 2 knots, and ceases at 2 o'clock; and at 4 or 5 leagues in the offing it runs till 3 o'clock, or 40 minutes after high water at Leith.

The stream runs past Girdleness till 2h. 30m., or 10m. after high water at Leith; springs at the rate of  $2\frac{1}{2}$ , neaps  $1\frac{1}{2}$  knots. It runs across the mouth of Montrose Harbour and past Red Head till 3 o'clock, or 40 minutes after high water at Leith. From Red Head it sets into St. Andrews Bay till the last quarter, which sets S. and S.S.E.; but to the westward of Red Head it sets W.S.W. past Arbroath and over the Tay Bar.

At 2 miles without the Bell Rock Lighthouse the flood continues running to the southward till 2h. 55m. after high water at Leith; but between the Bell Rock and Fifeness it changes 2 hours earlier. The first part of the latter stream sets towards May Island, the middle to the South, and the last part S.S.E. The first part of the ebb sets from E.N.E. to N.E., the middle N.N.E., and the last part more northerly.

About a mile off St. Abbs Head the flood stream runs to the south-eastward till 2h. 55m. after high water at Leith; but at  $5\frac{1}{2}$  or 6 leagues in the offing it continues a quarter of an hour later. About 3 miles off Berwick it runs till 4h. 10m. after high water at Leith.

At 5 miles off North Sunderland Point, and at the same distance south-eastward of the Staples, the flood stream continues till 3h. 25m. after high water at Leith.

About 2 miles off Blyth Harbour, and 4 miles off Tynemouth, it runs to the southward till 3h. 40m. after high water at Leith; and at 4 miles off Sunderland, a quarter of an hour later.

At 3 of 4 miles off Hartlepool, and at the same distance off Whitby the flood stream runs to the southward till 4h. 10m. after high water at Leith; and at the same distance off Flamborough Head it continues to run half an hour longer.

Near the Norfolk and Suffolk coasts the streams of tide run nearly parallel to the shore. Off Wells the flood runs to the eastward till 9 o'clock, or three hours after high water on the shore.

Four miles off Cromer, and the same distance off Hasborough, the flood stream runs along shore to the southward till 10h. 15m., or 1h. 45m. before high water at Harwich, and the ebb in a contrary direction.

At 2½ miles off Lowestoft the flood stream continues to run to the S.S.W. till 1h. 30m. before high water at Harwich.

At Orfordness the flood stream continues to run till about high water in Harwich Harbour; the flood sets W.S.W., and the ebb E.N.E.

At Margate it is high water about 11h. 40m. by the ground. Near the East buoy of Margate Sand, at the first of the flood, on the shore the stream sets S. by W., veering westward, till about half flood, or 9h. 15m., it sets west, and continues veering, till at high water it falls slack at N.N.W. The ebb stream begins at N.E., veering eastward, and increasing in strength till about half ebb, or 2h. 45m., when it sets S.E. by E., still veering, and the latter part with diminished velocity, till at low water it falls slack at south.

In the River Medway the flood stream runs up in mid-channel from twenty to twenty-five minutes after high water at Sheerness Dock-Yard; but at the Nore Light Vessel, although it is high water by the ground a few minutes earlier than at the Dock-Yard, yet the stream runs up the Thames for half an hour after high water at the Yard.

It remains to be noticed that the direction of strong winds, as well as the varying pressure of the atmosphere, considerably affect both the times and the heights of high water. Thus in the North Sea a strong N.N.W. gale and a low barometer raise the surface 2 or 3 feet higher, and cause the tide to flow all along the coast from the Pentland Firth to London half an hour longer than the times and heights predicted in the Tables. Easterly, S.E., and S.W. winds produce opposite effects, which will be felt as far down the Channel as Dungeness. On the contrary, at the entrance of the Channel, at Plymouth, and as far up as Portland, south-westerly winds, with a low barometer, raise the surface of the water; and north-easterly winds and a high barometer always lower it.

The winds affect also the locality of the meeting of the North Sea and Channel tides: during moderate breezes this takes place somewhere between the North Foreland and the north end of the Goodwin Sands, to the southward, and between the Kentish Knock and the Galloper to the northward; but both these places of meeting are liable to be removed further south or north by strong northerly or south-westerly winds.

## THE TIDES AMONG THE ORKNEYS.

By COMMANDER F. W. L. THOMAS, R.N.

THE great rapidity of the tidal streams among the Orkneys makes a correct knowledge of their periods and velocities of the utmost importance to the mariner. *General Remarks.*

In the terrific gales which usually occur four or five times in every year, all distinction between air and water is lost, the nearest objects are obscured by spray, and everything seems enveloped in a thick smoke; upon the open coast the sea rises at once, and striking upon the rocky shores, rises in foam for several hundred feet, and spreads over the whole country.

The sea, however, is not so heavy in the violent gales of short continuance as when an ordinary gale has been blowing for many days; the whole force of the Atlantic is then beating against the Orcadian

shores, rocks of many tons in weight are lifted from their beds, and the roar of the surge may be heard for twenty miles; the breakers rise to the height of sixty feet, and on the North Shoal, which lies 8 miles N.W. of Costa Head, the broken sea is visible even at Skail and Birsá.

Similar effects may be witnessed in any stormy region, but here they are increased by the power of the tidal stream, and when the whole mass of water is in motion, a very slight inequality at the bottom of the sea is indicated by a ripple on the surface, so that by these means I have detected shoal spots (to the eastward of North Ronaldsha) at a depth of 47 fathoms, though the difference in depth was but 20 feet. On the rocky bank of the North Shoal, which is about 4 miles in length, the ripple readily distinguished any inequality of 10 and 15 feet, at a depth of 30 fathoms, even when the stream was moving but one mile per hour. It is only in calm or very fine weather that these rippings can be observed, but when the wind increases upon a weather tide the sea will break over every inequality of the sea bottom. These broken seas are dangerous, and during the survey of these Islands I have often been in great peril from moving the ship before sufficient time had elapsed for the sea to become quiet.

*Depth of the  
Tidal Stream.*

*High water  
at*

*Stromness,  
Pierowall,*

*Otters Wick,*

*Holm Sound.*

The body of the tide-wave comes from the N.W., and makes high water on the whole west coast of the Orkneys at nearly the same time; the establishment for Stromness being 9 o'clock, and that for Pierowall in Westra, is about 6 minutes later. At the north-east end of the Orkneys it is but a few minutes later than at the north-west, as the establishment for Otters Wick is 9h. 13m.; but the tide there is probably retarded by having to pass over the shoal water at the mouth of the bay.

On the south-east side of the Orkneys, in Holm Sound, the high water there being derived from the tide-wave entering by the Pentland Firth takes place about 9h. 35m.

The vulgar establishment, or time of high water, full and new moon, varies greatly; the mean of nine observations at Otters Wick gives 9h. 13m., but they vary between 8h. 58m. and 9h. 42m.

*Difference of  
Sea-level.*

When the tide has to pass through a narrow or shallow channel, the retardation is very great; thus it is high water an hour earlier at the mouth of Eynhallow Sound than at Kirkwall, though the distance is but 11 miles; and by levelling across Sanda (about half a mile), it appeared that when it was high water at Otters Wick, the sea-level was 4 feet 8 inches above the sea-level of Catasand, and that high water was 1h. 43m. later at Catasand than at Otters Wick.

*Mean range at  
North Isles.*

The mean range of tide at springs in the North Isles of the Orkneys is 11 feet 2 inches, and at neaps 5 feet 6 inches.

*Semidiurnal  
inequality.*

Extraordinary springs may be 3 feet 4 inches above or below the mean; this result is greatly increased by the semidiurnal inequality; for in some instances the difference in the rise of two consecutive tides has been observed to amount to 2 feet 10 inches.

*South Isles.*

In the South Isles the mean range at springs is about 1 foot less than in the North, being 10 feet; at neaps 5 feet.

*Set of tide,  
Mull of Papa.*

The passage from the westward round the North end of the Orkneys is rendered somewhat treacherous by the peculiar set of the tide; for the body of the flood stream coming from the north-west, a ship must be 6 or 7 miles to the northward of the Mull of Papa to drift clear of North Ronaldsha. The first half of the flood sets from the Mull right for North Ronaldsha (S.E. b. E.  $\frac{1}{2}$  E.), and should the wind fail while the flood is running, there would be a great probability of drifting ashore.

*from Mull of  
Papa to North  
Ronaldsha.*

The flood stream passes slowly the North coast of Westra (sending a weak offset between Papa and Aikerness), and joins the main

am off Moul Head, where a bore or *röst*\* is formed, which stretches several miles to sea. The tide here runs about 6 knots; between Papa North Ronaldsha 3 knots; but near North Ronaldsha the rate increases to 6 knots, passing over the Altars of Linnay and Seal Sherry with great violence. The flood splits on the West coast of North Ronaldsha with the Established Kirk (the southernmost) in one small byre; and should a vessel be drifting down on the island, should endeavour to pass to the southward, when she will go clear of everything.

*Bore off Papa.  
Rate of Tide.*

off Seal Sherry there is a bad *röst* with southerly winds, and the tide runs at six knots between that point and Dennis Head; it does not, however, touch the shore, but leaves a small eddy or counter-tide, where boats can turn up as far as the Sherry.

*Seal Sherry  
Röst.  
North  
Ronaldsha.*

The tide sets strongly between Fair Isle and the Orkneys. For on one occasion having Dennis Head bearing S.  $\frac{1}{4}$  E. distant 8 miles, the tide having set S.E.  $\frac{3}{4}$  S. for three hours, and being then high water on the shore, it shifted its direction  $3\frac{3}{4}$  points; that is, it set South for the next three hours, or until it was half-ebb on the shore, its greatest rate being 3 to 4 knots. An hour before this, the vessel's track began to take a curved form, which continued to grow sharper as the rate of tide decreased, so that without any stopping, we found ourselves running with the ebb stream North, and parallel to, but at the distance of several miles from, our former track. The ebb stream continued steadily for four hours, running 2·8 at its strength, after which it began to curve to the eastward; the stream thus appearing to describe a long curve, and revolving in the direction of the hands of a watch.

*Tide Streams  
between Fair  
Isle and the  
Orkneys.*

It also appears that when it is half-flood on the shore, it is slack in the stream; that when it is low water on the shore, the flood-current is running strongest, but changing its direction from S.E.  $\frac{3}{4}$  S. to South, and that the reverse happens during ebb tide.

*Tide and half-  
tide.*

These observations will show how little dependence can be placed on a direct course among these treacherous tides; and those who have been beating about for some days against a head wind are particularly exposed to this danger. It is a common remark with the people of North Ronaldsha, that all vessels come ashore with the flood; and it is readily seen how this takes place, for the accident of it being either flood or ebb tide will make a difference of between 30 and 40 miles in position.

The flood stream from Runabrage sets into North Ronaldsha firth at the rate of 3 knots; from the Holms of Eyre it sets over the Baas of Runabrage, and both streams passing through the firth at the rate of 4 knots, continue to run two hours after high water on the shore.

*North  
Ronaldsha  
Firth.*

Off the Start the first of the flood sets to the southward at 4, but changes, as the stream grows older, to S.W. There is an extremely strong *röst* off the Start with southerly winds and flood tide; it stretching 4 miles to sea, but being heaviest near the shore.

*Start of Sanda.  
Röst.*

Between Westra and Sanda the stream is scarcely sensible, but increasing in strength as it approaches Calf Sound and Lashy Sound, it runs through those narrow passes at the rate of 6 knots; but decreasing to 2 or 3 knots in Eda Sound, where the stream falls into the Sanda Firth. In those Sounds the stream runs  $1\frac{1}{4}$  hours after it is high water on the shore.

*Calf and Lash  
Sounds.*

In Spurness Sound the tide begins to the eastward half-an hour before low water on the shore, or  $1\frac{3}{4}$  hours before it is low water in the Sound, and turning every six hours. This stream is like a mill-race in

*Spurness  
Sound.*

\* (pronounce *rust*) a Scandinavian word, meaning a roaring, broken, tidal sea.



- the narrows when passing Spur Ness, but it speedily becomes in Sanda Sound, and off Kettletaft it scarcely runs 2 knots.
- Stronsa and Westra Firths.* In the Stronsa and Westra Firths, which form one continuous nearly straight channel, the tide stream is very rapid, as through and Enhallow Sound the body of the ocean tide is discharged.
- North Shoal.* At the North Shoal, which is 15 miles from the entrance of the tide sets W. by S. (towards the entrance), and at spring runs 2 miles an hour; neaps about one.
- Brough of Birsa.* Along the coast of West Mainland, or Pomona, the stream is sensible off the points; but off the Brough of Birsa the flood sets to the northward for two hours after it is high water on the shore when its greatest rate is 2 knots.
- West coast of Rowsa.* From the Brough of Birsa the flood sets along shore for 6 hours to the Sacquoy Heads, increasing in velocity as it approaches the Westra Firth. The influence of the indraught through Eynhallow Sound is scarcely felt beyond a line joining Costa Head and the Reef of Gairra.
- Skea Skerries.* The flood stream runs South along the West coast of Westra Firth, and the Noup to the point of Skea, and over the Skea Skerries. Between them and Rowsa the stream acquires great force, even 6 knots; it does not turn for two hours after high water on the shore.
- Kili Holm. War Ness.* The weight passes close round Kili Holm, and crosses for War Ness (South Point of Eda,) and the Greenholms.
- Stronsa Firth.* At War Ness the tide stream runs 7 knots, and the current is passable during southerly gales and spring flood. At that time the Sound between the Gio Ness of Shapinsha and War Ness is in great commotion, and when bound to Stronsa, a line of breakers many times to be seen roaring and foaming within half a cable's length, and vainly looking for a gap or smooth.
- The main stream from War Ness, joined by the Stream from Eynhallow, sets past Rousholm Head, and clear of Auskerry to the open sea, and from the Greenholms, past Shapinsha and Deerness, where it is called by the String, the usual name for the direct run of the stream through Enhallow Sound by Gairra, Eller Holm, and Deerness. Its rate is 6 knots between Shapinsha and Rousholm, and between the Mull of Gairra and Auskerry about 4 knots.
- Weatherness and Fara Ness Sounds.* The tides in Weatherness and Fara Ness Sounds are peculiar. The stream turns to the eastward as soon as the tide has ceased to set to the shore; that is, the flood stream makes  $2\frac{1}{2}$  hours before it sets to the Westra Firth. The stream pours through the narrows of Weatherness and Fara Ness Sounds at the rate of 4 knots, and then sets westward towards Calf Sound.
- Egilsha and Shapinsha.* A very weak stream runs south through Howan Sound during flood, and it is also weak on the East side of Egilsha; for the body of the stream goes transversely across the channel, and leaves comparatively still water along Egilsha and the North side of Shapinsha.
- Eynhallow Sound.* The flood stream from Costa Head and the reef of Queen's Head, towards Eynhallow, and divides there, passing Burgher and Race at the rate of 7 knots; the streams unite when past the Mull of Gairra, and do not average more than 4 knots down Eynhallow Sound.
- Wyre Sound. Swine Holm.* A very weak stream passes eastwards through Wyre Sound, and another South of Wyre island; but off Swine Holm, where the stream unites with that from the Westra Firth, the rate scarcely exceeds 2 knots. In the narrow channels among the group of Holms, between Gairra and Shapinsha, the flood sets southerly 6 knots.
- Between Gairra and Shapinsha.* The main stream from Eynhallow Sound passes S. of Gairra, and thence transversely to Stromberry Head, and on through the Mull of Gairra Sound. The tide stream is narrow in its passage between War Ness and Eller Holm, nor does the *String* expand for some distance.
- and by Work Head.*

passing that place; the rate at springs is about 3 knots, and the stream does not turn till  $1\frac{1}{4}$  hours after high water on the shore.

The flood-stream running through Hoy Sound commences on the North Side at the Millstone Quarry, 4 miles from Hoy Mouth, and on the South from Hoy Head; the indraught is scarcely felt 5 miles outside the entrance. *Hoy Sound*

In Hoy Mouth the rate of the stream is 4 knots, until it divides upon Gremsa, when the rate increases to 6 knots; one stream passing through Burwick Sound, the other between Gremsa and Stromness. *Burwick Sound.*

The tide goes over the Skerry Ness, and from thence sets fair for the Skerries of Clestron, where it divides, one stream running up and filling the Bay of Ireland, and at half flood setting as a back-tide out of Cairston Road; the other setting rather off shore at first, and then towards Houton Head. *Houton Head.*

From Burwick Sound the stream sets along the shore of Hoy to Green Head, the rate being scarcely 3 knots; and Gremsa causes a large arrear of slack water in the middle of the Sound. After passing Houton Head, the flood stream becomes diffused in Scapa Flow, and is only sensible off that point; its general direction is towards Holm Sound, and at the Barrel of Butter it scarcely runs 2 knots at springs. On the West side of Holm the stream drains along shore to Halcrow Head, where it meets the stream from the Pentland Firth. *Scapa Flow.*

The tide stream runs with greater velocity and turbulence through the Pentland Firth than in any other part of the Orkneys; so that with a strong gale and a weather spring-tide the sea is in many places impassable, and after the wind has gone down, the sea continues to break with great violence for some days, indeed in a sailing ship more danger is to be apprehended from a calm than from a gale of wind. The tide wave from the Atlantic, opposed by the West coast of the Orkneys, is pressed against the shores of Caithness, where at Thurso the tide rises nearly 5 feet higher than at Stromness, though the latter is but 20 miles to the northward. This accumulated mass of water finds egress through the Pentland Firth, where the velocity of the stream near the Little Skerry was said by Captain Otter to have acquired the rate of 10 knots. At the Great and Lother Skerries, which resist a large body of the tidal stream, the water is sensibly higher by 1 or 2 feet upon the stream side, and a small rapid is formed, of little height indeed, but of great power. Vessels that have drifted upon this rock, when covered by the tide, have been rolled over it, and sunk in deep water on the other side. *Pentland Firth.*

The establishments of the following places in the Pentland Firth were determined by Captain Otter:—

*Establishments.*

PLACE.	High Water.	Rise above the Spring L.W.		Range, or Rise between L.W. and H.W.		REMARKS.
		Spring.	Neap.	At Springs.	At Neaps.	
Thurso, Scrabster Road.	h. m. 8 28	ft. in. 14 10	ft. in. 11 0	ft. in. 14 10	ft. in. 5 6	Deduced from 4 years observations. Mean of 19 comparisons, but very irregular. Mean of 12 comparisons with Thurso.
Duncansby Ness	10 14	10 0	8 6	10 0	4 0	
Stroma, South Side	9 47	9 0	7 6	9 0	4 0	
Swona, East Side	10 24	- -	- -	- -	- -	Mean of 33 comparisons with Thurso.
Pentland Head, Great Skerry, East Side	9 35	- -	- -	- -	- -	
West Side	11 4	9 3	8 0	9 3	3 0	
Great Skerry, West Side	10 53	- -	- -	- -	- -	Mean of 7 comparisons with Thurso.
Widewall	9 3	- -	- -	- -	- -	

The directions as well as the velocities of the tidal streams in Pentland Firth vary with the hour of the tide; and in almost every case the flood takes a more southerly direction as the tide grows on and the contrary with the ebb.

*Rate.* The flood stream comes South along the shore of Hoy, and East along the coast of Caithness; and the indraught increases in approaching entrance. Between Turn Ness and Dunnet Head the usual spring rate is 7 knots, but as they round the South end of Swona and North end of Stroma, it rises to 9 knots, and when rushing past the Great Lothar to 10. About  $1\frac{1}{2}$  hours after it is high water on the shore the flood stream makes strong along the coast of South Walls, curving to the northward of Swona, washes the Great Lothar, and passes to the northward of the Pentland Skerries.

*Direction.* At a later period of the tide, the stream from Brims Ness goes direct to the South end of Swona and to the Southward of the Pentland Skerries; so that after it is half flood in the stream (equal to high water on the shore), if a ship is a mile to the southward of Brims Ness, she may pass a mile to the southward of Swona, and the same distance to the southward of the Skerries.

*Hoxa Sound.* From Cantick Head the flood stream sets past Stangar Head, crossing Hoxa Sound divides on the Lime Kiln; one very weak stream setting to the southward along South Ronaldsha, while the other about 4 knots towards Water and Holm Sounds.

*Holm Sound.* Through Holm Sound the rate of the stream is 6 knots where strong, and it turns at one hour after it is high water on the shore. The rate through Water Sound is 4 knots.

*Water Sound.* From Cantick Head a weak stream runs northwards, filling the Hope and the bays on the east side of Hoy, and finding outlets through Gutter and Weddel Sounds; the rate at springs in the narrowest of these Sounds is 2 knots.

*Cantick Sound.* Between Cantick Head and Swona the general direction of the stream is towards South Ronaldsha, and southward between it and Swona; but it is almost impossible to predict exactly what direction a driven vessel would take; with Barth Head open North of Swona, the quarter flood would send her to the northward of that island, and through the mid-channel between it and South Ronaldsha; but the half flood would probably press her too close to Barth Head, and perhaps to the Great Lothar.

*East side of Hoy.* The first of the flood stream from Widewall sets direct on Hoy Head and the Lothar, so that in light winds vessels should in all cases pass as near to the North Head of Swona as possible. As a general rule, if a ship, having left Widewall with light winds and flood, should drift nearer to Swona than Barth Head, she will be likely to clear the Lothar—if nearer to Barth Head, she will go too close to the rock.

*Pentland Firth; round Swona;* When the flood stream first makes at the north head of Swona it first sets across the channel, but presently turns to the southward, passing clear of the Lothar, and then to the northward of the Pentland Skerries; but after half flood in the stream, equal to high water on the shore, the stream from the north end of Swona bends round to the southward of these islands, and consequently, at a certain period of the tide towards them.

*Pentland Skerries.* Between the Lothar and the Skerries the flood stream sets fair to sea, about E.S.E., joining the main stream from Stronsa Firth.

From the South end of Swona the first flood sets right on the North Skerry, dividing there, and running 7 knots close to the North Skerry. On the South side the stream sets off (leaving a narrow eddy inside) first towards the Little Skerry, but it gradually curves and goes clear

the Clette. A vessel, however, must be very near the Great Skerry to drift in that direction; if only half way between the Great and Little Skerries she would infallibly drive upon the rocks, where the current runs like a mill-stream. It must be observed, that the general tendency of the flood-stream is to set clear to the westward of the Skerries, and that a vessel must be very near the opening between the Great and Little Skerries before she would feel its indraught. After half tide in the stream, the set of flood from Swona goes well clear to the southward of the Pentland Skerries.

I cannot state with the same personal confidence the direction of the streams of tide on the South side of the Pentland Firth, but the experiments of Capt. Otter show that the flood stream from Dunnet Head and St. Johns Point has a tendency to pass to the northward of Stroma, so that a buoy set adrift within half a mile of Mey Bay will not float through Inner Sound, but rather drift on shore on the west side of Stroma; and from this it would appear that a vessel one mile to the northward of Dunnet Head, with strong flood, will go well clear to the northward of Swona.

*Inner Sound.*

The last of the flood stream is pressed down upon Duncansby Head, where it does not cease running till 4 hours ebb on the shore; for which reason, when a vessel is turning up from the southward, she should rather endeavour to enter the Firth upon the North side, when she will usually be able to get as far as Brough Ness while the flood is still running.

*Duncansby Head.*

There are large eddies under Stroma and Swona with the flood, and where they meet the main stream little whirlpools are produced, which credulity has exaggerated into objects of importance; on rare occasions they might be dangerous to boats.

*Eddies of Swona and Stroma.*

It is almost still water to the eastward of the Skerries during flood, and a large eddy is formed between the Great Lothor and Old Head, commencing at half-flood on the shore; it is called Liddel Eddy, from a farm of that name in South Ronaldsha.

*Eddies of Pentland Skerries; and Liddel Eddy.*

Wherever the tide stream is rapid past any point there is always an eddy on the opposite side, and these eddies increase as the tide grows older, till at last only a narrow stream of the former tide is left; this may be well witnessed in Hoy Sound, where the flood stream is sometimes diminished by the encroaching ebb to 20 and 30 feet in breadth.

The indraught of the ebb stream to the Pentland Firth is felt at a considerable distance from the entrance, so that vessels leaving the Mull of Deerness in calm weather are sometimes drifted into the Pentland Firth. From Copinsha the stream runs nine hours to the southward, from half flood on the shore to low water; but its rate is slow, never exceeding 2 knots, except near Old Head, where it runs four.

*Ebb stream,*

There is not much danger to be apprehended from the ebb stream in the Pentland Firth when it has made strong; about 3 hours after low water on the shore, it sets fairly through between Duncansby Head and the Skerries, between Swona and Stroma, and over towards Hoy; and a vessel must be far within a line joining Duncansby Head and the North end of Stroma, to feel the indraught of the Inner Sound; for a buoy that has drifted through that Sound with the flood stream will not return with the ebb.

*in the Firth.*

Round Brough Ness the ebb pours with great violence, and over the tail of the Great Lothor, where several vessels have thereby been lost.

*Inner Sound.*

The stream from the North side of the Pentland Skerry sets upon Swona, dividing upon the South Clette; but the last part of the ebb will go to the northward, between Barth Head and Swona.

*Great Lothor.*

*Swona.*

From the North Head of Swona the first ebb goes towards Brims Ness, the last towards Switha. There is a very large eddy under Swona

*Eddy.*

during ebb tide, which before the tide is done almost reaches as far as Cantick Head.

*Eddy of  
Stroma.*

The ebb stream sets fairly through the Firth from the North end of Stroma till it meets the stream coming from Inner Sound and inclines to form a large eddy; at half tide these united streams set over toward Turn Ness where the last of the ebb tide drains, while there is comparatively little water on the South side, between Dunnet Head and St. Johns Point.

It does not appear necessary to follow the course of the ebb stream throughout the Orkneys, as in almost every case it is the reverse of the flood, nor to enter into detail of those phenomena which are common to all masses of water in motion, and which any one, by observing the directions of the channels and the apparent obstructions of several streams, can learn from the chart.

#### REMARKS ON THE SET OF THE TIDAL STREAMS THE IRISH AND ENGLISH CHANNELS, AND IN THE NORTH SEA.—BY REAR-ADMIRAL F. W. BEECHEY, F.R.S.

*The Common  
Standard for  
the turn of the  
Streams*

A CAREFUL investigation of the tides in the Irish Channel, the English Channel, and in the North Sea, has shown the possibility of referring the movements of the several streams to a common standard, instead of resorting to the troublesome process hitherto in use, of comparing the motion of the streams with the varying times of high water at the coast.

*is High Water  
at Dover and  
Liverpool.*

For the entrance of the English Channel and North Sea the time of high water at Dover may be considered the standard; and for the whole of the Irish Channel, the time of high water on the shore at the entrance of Liverpool.

*Off mouth of  
English  
Channel.*

Off the mouth of the English Channel the stream, although materially influenced by the indraft and outset of the Channel, will be found running to the *northward and eastward*, while the water is *falling* at Dover; to the *southward and westward* while it is *rising* at that port. The particular direction given to the stream in this part of the sea, by the meeting of the Channel and of the offing tides, will be shown in the following table (Compartment I.); and it is only necessary to mention here, that the southward of the parallel of Scilly, the tides of the Channel and of the offing blend together with varying force and direction, and occasion the stream to be constantly changing, and in some places even to run in the entire circuit of the compass in one tide, without ever remaining long upon any one point. So that any written description of the course is rendered almost impossible, and the table alone must be consulted for the direction at any particular hour. From this revolving motion of the stream, it has been asserted that a vessel can never be carried far in any one direction by the tide. Such, however, is the case; for, although it may be true that while at anchor in a particular spot the vessel's head will turn to every point of the compass, directly she is loose she will be carried away upon a rhomb depending upon the state of the tide at Dover.

*South of Scilly.*

*Bristol Channel.*

From the parallel of Scilly to the Bristol Channel the stream is regular, and while the water is *falling* at Dover, will be found setting to the *northward*: near the coast partaking of the direction of the shore, turning sharply round Trevoze Head and Hartland Point into the Br

Channel; and while the water is *rising* at Dover, setting as sharply out of the Bristol Channel and along the land towards Scilly.

By many observations, the Light vessel at the Seven Stones has been found to swing to the *northern* tide 7 minutes after high water at Dover; and at Trevoze Head the northern tide to make 12 minutes after Dover. And as a vessel advances up the Bristol Channel the stream turns progressively later. The tides of that estuary do not follow the same law exactly as the tides of channels which are open at both extremities. The directions of the stream in the Bristol Channel will be given hereafter; at present I wish to draw the attention of the seamen to the particular fact, that while the stream from Scilly is setting to the *northward* the stream from the Irish Channel will be found setting to the *southward*, and that these streams meet off the entrance of the Bristol Channel in about the parallel of  $51^{\circ}00$  where both turn into that channel. As a general rule, in all the space eastward of a direct line joining Scilly and the Tuskar, the stream will be found running to the eastward towards the Bristol Channel, while the water is *falling* at Dover and Liverpool, and *vice versâ*, setting to the *north-east* on the southern side of the Channel and to the *south-east* on the northern side. Such is the general set of the stream in this part of the sea, which I have given in general terms to show that to the eastward of the line above mentioned a strong indraft towards the Bristol Channel will always be experienced while the water is falling at Liverpool, and *vice versâ*. To the westward of this line the tides appear to be slack; but we are in want of further observations in all this part before any particulars can be entered into. Towards Cape Clear the northern stream from Scilly seems to join the southern and western streams from the Irish Channel, and both pass to the north-west round Cape Clear, and *vice versâ*.

Seven Stones.

Meeting of the Stream in  $51^{\circ} N.$

Streams between Scilly and Tuskar.

Off S. coast of Ireland.

At the Smalls Lighthouse it is slack water 5 minutes before high water at the entrance of Liverpool; the stream sets past the rock in a S. by W.  $\frac{1}{4}$  W. direction while the water is *falling* at Liverpool, and N. by E.  $\frac{1}{4}$  E. while it is *rising* there, veering to N. by E. during the two last hours of the tide. The strength of the tide is sensibly felt hereabout and all the way from the Smalls to Pembroke, running upwards of  $3\frac{1}{2}$  or 4 knots at the height of the springs. To the southward of the Smalls the stream sweeps round in a broad curve to the S.E., and enters the Bristol Channel while the water is *falling* at Liverpool and *vice versâ*, as before stated. The entrance of Liverpool is properly the standard to which the turn of the stream in these pages is referred, and wherever a reference is made to that place it must be understood as being 18 minutes *earlier* than the time of high water at St. Georges Pier, to which the tide tables are adapted.

Off the Smalls.

On the Irish side, at the Saltees Lightship, for instance, the water is slack 22 minutes before it is high water at Liverpool entrance. The stream sets W.S.W. from a quarter of an hour before high water at Liverpool entrance to  $1\frac{1}{2}$  hours after, and then W.N.W. to low water. The flood or *rising tide* at Liverpool sets past the Saltees for the first 3 hours E. by S., then E.S.E. for the 2 next hours, and S.E. by E. for the last hour, when the tide slacks, as before, 22 minutes before high water at Liverpool entrance.

Off the Saltees.

From the Saltees Lightvessel to the Tuskar the stream sets along the land, but towards Carnsore Point begins to tend to the northward on the flood, and finally sets sharply round that point into the Irish Channel, and must be carefully watched by vessels in this situation.

Off Carnsore Point.

## SECTION I.

THE TIDAL STREAMS OF THE IRISH CHANNEL, WITH  
SHOWING THEIR COURSE AND RATE WHEN AT THEIR  
STRENGTH.

*Streams turn  
with the tides  
of Liverpool  
and Morecambe  
Bay.*

IN the Irish Channel, as before observed, experiments have notwithstanding the variety of times of high water throughout the turn of the stream over all that part which may be a fair navigable portion of the Channel is nearly simultaneous. Northern and southern streams in both Channels commence all parts (practically speaking) at nearly the same time; at the same time happens to correspond nearly with the time of high and low water at the shore at the *entrance* of Liverpool and of Morecambe Bay. It is remarkable as being the point where the opposite tides of the extremities of Ireland terminate. So that it is necessary to know the times of high and low water at either of these points to determine the hour when the stream of either tide will commence in any part of the Channel. For this purpose the tide-table may be used, subtracting 18 minutes from the time given, in consequence of the high water at St. Georges Pier being 18 minutes earlier than the point which is considered as the head of the tide.

*Streams enter  
N. and S. of  
Ireland.*

The tide from the Atlantic enters the Irish Channel by two points, of which Carnsore Point, the S.E. point of Ireland, and Head, the S.W. point of Wales, are the limits of the southern Channel. Rathlin and the Mull of Cantyre the boundaries of the northern Channel.

*Southern  
streams from  
Tuskar to the  
Isle of Man.*

The *central portion of the stream* of flood or *ingoing* stream nearly in a line from a point midway between the Tuskar and the Point of Ayr, to a position 16 miles due west of Holyhead; beyond which it expands eastward and westward; but its main body preserves its direction straight forward towards the Calf of Man, which it passes at a moderate rate on towards Maughold Head. Here it is joined by the flood or southern stream from the North Channel at the Point of Ayr, and is first turned round to the eastward then goes on with it at an easy rate direct for Morecambe Bay, changing its direction nearly eight points.

*Eastern Branch  
of S. stream sets  
into Cardigan  
Bay.*

The *outer portions* of the stream are necessarily deflected from the course of the great body of the water by the impediments of the Irish side of the Channel, and by the tortuous form of the coast of the Welsh. The eastern portion passing Linney Head, rushes with rapidity between the Smalls, Grassholm, and Milford Haven Bishops, which it passes at a rate of between 4 and 5 knots; round those rocks in an E.N.E. direction right over the Bass into Cardigan Bay; makes the circuit of that Bay, and sets towards Bardsey, at the other extremity of it; then sweeps N. by W. past the island and through the Sound, it gradually follows the course of the shore, round Caernarvon Bay, filling the Mersey as far as Bangor; but the stream still continuing outside the South Stack, which it rounds, setting towards the Skerries at a rate of upwards of 4 knots; and, finally, turns sharp round those

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\* The entrances of Liverpool and of Morecambe Bay are, as before observed, 18 minutes earlier in their times of high water, than those given for Liverpool tables.

Liverpool and Morecambe Bay; completing in its way the high water in the Menai, and filling the Dee, the Mersey, and the Ribble.

The *western portion of the stream*, after passing the Saltees, runs nearly in the direction of the Tuskar, sets sharply round it, and then takes a N.E.  $\frac{1}{2}$  N. direction, setting fairly along the coast, but over the banks skirting the shore, so that vessels tacking near the inner edge of the sands on the flood, and on the outer edge on the ebb, have been carried upon them and lost, especially upon the Arklow and Codling Banks. Abreast of the Arklow is situated that remarkable spot in the Irish Channel, where the tide scarcely either rises or falls. The stream notwithstanding sweeps past it at the rate of 4 knots at the springs, and reaches the parallel of Wicklow Head. Here it encounters an extensive projection of the Codling bank; and while the outer portion takes the circuit of the bank, the inner stream sweeps over it, occasioning an over fall and strong rippling all round the edge, by which the bank may generally be discovered. Beyond this point the streams unite and flow on towards Howth and Lambay, growing gradually weaker as they proceed, until they ultimately expend themselves in a large space of still water situated between the Isle of Man and Carlingford. There we have not been able to detect any stream; for there another remarkable phenomenon occurs—the water rising and falling without having any perceptible stream. This space of still water is marked by a bottom of blue mud. Such is the course of the flowing water of the Southern Channel.

*Western Branch sets over the Irish banks.*

*Off Arklow, no rise or fall.*

*Codling Bank.*

*Stream ends off Carlingford. No stream there.*

In the North Channel the stream enters between the Mull of Cantyre and Rathlin Island simultaneously with that passing the Tuskar into the Southern Channel, but flows in the contrary direction. It runs at the rate of 3 knots at the springs, increasing to 5 knots near the Mull, and to 4 near Tor Point on the opposite side of the channel. The eastern branch of this stream turns round the Mull towards Ailsa and the Clyde, a portion passing round Sanda up Kilbrennen Sound and Loch Fyne. The main body sweeps to the S. by E., taking nearly the general direction of the Channel, but pressing more heavily on the Wigtonshire coast; off which it has scooped out a remarkable ditch, upwards of 20 miles long by about a mile only in breadth, in which the depth is from 70 to 100 fathoms greater than that of the general level of the bottom about it. Near the Mull of Galloway the stream increases in velocity to 5 knots; the eastern portion turns sharply round the promontory towards the Solway, and splits off St. Bees Head, one portion running up the Solway, and the other towards Morecambe Bay.

*Northern Stream from Rathlin to the Clyde.*

The *central portion* midway between the Mull of Galloway and the Copeland Island presses on towards the northern half of the Isle of Man; and while one portion of it flows towards the Point of Ayr, the other makes for Contrary Head, and is there turned back to the N.E. at a right angle nearly to its early course. Passing Jurby Point, it re-unites with the other portion of the stream and they jointly rush with a rapidity of from 4 to 5 knots round the Point of Ayr, and directly across all the banks lying off there, and catching up the stream from the south channel off Maughold Head, they hurry on together towards that great point of union, Morecambe Bay. This bay, the grand receptacle of the streams from both Channels, is notorious for its huge banks of sand, and also remarkable for a deep channel scoured out by the stream, and known as the Lune Deep, which is the great beacon to all vessels bound to that place.

*Central portion of this stream sets to Isle of Man and Morecambe Bay.*

*Lune Deep.*

We have now only to speak of the *western limit* of the stream, which was left off Tor Point running at a rate of 4 knots off the pitch of the point. Hence it strikes directly towards the Maidens, boiling over the Highlander and Russel Rocks, and other reefs in the vicinity of that

*Western branch of N. stream to Maidens and Belfast.*



dangerous group; and takes the direction of the coast again from Mull Island to Black Head, at the entrance of the Lough of Belfast, which fills.

*Belfast Lough.* The portion of the stream which sets into Belfast Lough splits at Grey Point; one portion flowing up towards Garmoyle, while the other bends back along the shore of Bangor, Groomsport, and Orlock, and blends with the general stream which has come on from the Maidens and Blackhead in nearly a straight line, and passes with it through the sounds of the Copeland Islands. Hence it proceeds along the coast, brushes the South Rock, and runs on towards St. Johns Point; off which the stream, like that coming from the southward, expands itself in the large space of still water, which remains almost undisturbed, although pressed upon by streams from various quarters.

*Ingoing Streams.* Such is a general description of the streams in the Irish Channel, which are produced by the flowing of the water, or which, for the purpose of distinction, we may designate the *inging streams*.

*Outgoing Streams.* The ebbing or *outgoing streams* do not materially differ from the reverse of those, except that in the southern channel they press rather more over towards the Irish coast.

*Limits of the above Streams.* These observations do not, however extend beyond the points where the Channels begin to open out, that is beyond a line joining Rathlin and the Mull of Cantyre on the North, and the Saltees and Pembroke on the South. Outside of these limits, the waters diverge right and left; that on the north joining the stream from Jura, and turning sharp round Rathlin; that on the south, speaking now of the outgoing stream, sweeps past St. Davids Head into the Bristol Channel on one side, and on the other rounds the Tuskar, and passes on to Waterford.

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**TABLE SHOWING THE MAGNETIC DIRECTION AND RATE (AT SPRINGS)  
OF THE TIDAL STREAMS IN THE IRISH CHANNEL.**

In the following Table, the direction of the stream as it runs at the middle of the tide or at its greatest strength, is given at four places upon lines connecting well known headlands, viz., at 5 miles from the shore, on each side of the channel, and at a third of the distance across the channel from each of those headlands. The names of the places will be found in the marginal columns; and in the adjacent column, a brief description of the course of the streams in the immediate vicinity of each headland. The western part of the stream will be found on the left-hand page, and the eastern half on the right-hand page. *Explanation.*

To use the table, take the line nearest to your position, and at the distance across the Channel which answers best to your distance from the land, take out the direction of the stream from its column; or if the place of the ship falls between two divisions, take the mean of the two directions given in the columns for the direction of the stream at that time. To know when the stream will turn, look in the previous Tide Tables for the time of high water at Liverpool, for the day, and about 15 minutes after that time the stream will begin to *set out* in both the North and the South Channels, and will run in that direction until about 45 minutes before low water, when the general slack water begins. The slack water in the offing is usually spread over an interval of an hour—from the cessation of one stream to the beginning of the next.

In these tables { F stands for *flood* or *rising* tide at Liverpool.  
E stands for *ebb* or *falling* tide at Liverpool.

As a rough general rule, in the fair way of the Channel a vessel will be carried 9 miles by the stream in a whole tide at springs, and at neaps about 6 miles; but near to the land on either side, or to the banks, the rate of the stream greatly increases.

The rates given in the table which follows are at spring tides; and in order to adapt them to neaps, one third may be subtracted from them.

## TIDAL STREAMS

TABLE showing the DIRECTION and RATE (at SPRINGS)

Position.	Remarks on the Tides near the Land.	Magnetic Direction				
		From	5 Miles.	$\frac{1}{2}$ over.		
On a line joining the Tuskar and St. Davids Head.	The stream curves with the land and slacks in shore $1\frac{1}{2}$ hours before the offing, and inside the Long Bank $2\frac{1}{2}$ hours before Liverpool, the stream setting over the bank N. by W. & S. W.	Tuskar -	N.E. $\frac{3}{4}$ E. S.W. $\frac{3}{4}$ W.	Rate. 3 3	N. E. by E. $\frac{1}{4}$ E. s. w. by w. $\frac{1}{4}$ w.	Rate. $2\frac{1}{2}$ $2\frac{1}{2}$
On a line joining the Arklow Light Ship and Bardsey Island.	Near the Arklow bank the stream slacks half an hour before it does in the offing, and inside the Banks generally an hour and upwards before the offing.	Arklow Light Ship.	N.E. $\frac{1}{2}$ N. S.W. by S.	3.6 3.6	N.E. $\frac{1}{2}$ N. S.W. $\frac{1}{2}$ S.	$3\frac{1}{2}$ $3\frac{1}{2}$
On a line joining the Kish Light Ship and Holyhead.	The stream slacks at the Kish upwards of half an hour before the offing, and then bends inwards, towards the bay, setting over the Kish bank; further in shore it turns $1\frac{1}{2}$ hours before the offing, and 2 hours close in shore.	Kish Light Ship.	N.N.E. S.S.W. $\frac{1}{4}$ W.	2.0 2	N.N.E. S.S.W. $\frac{1}{4}$ W.	$2\frac{1}{2}$ $2\frac{1}{2}$

In approaching Holyhead be guarded against the tides which run very strong near the Headlands.

At 7 miles off the South Stack the stream runs  $2\frac{1}{2}$  knots at springs.

At 5 miles ditto ditto 3 to  $3\frac{1}{2}$  knots at springs.

At 2 miles ditto ditto 5 knots at springs.

The neaps run about two thirds of these rates. In the channel the direction of the flood is about N.E. by N., and near the Stack N.E. or N.E.  $\frac{1}{2}$  E. towards the Skerries. Off the Skerries, that is, outside them, the flood turns more easterly, or runs E.N.E., and to the northward of the Skerries due east, or E.  $\frac{1}{2}$  N.

Off the South Stack there is a race occasioned by the meeting of the tides, but increased by some uneven rocky ground off the Stack. It begins about the

Position.	Remarks on the Tides near the Land.	Magnetic Direction				
		From	5 Miles.	$\frac{1}{2}$ over.		
On a line joining the Calf of Man and the Skerries.	The flood stream meets the northern stream close to the Calf, and both run along the land to the eastward.	Calf of Man.	E. $\frac{3}{4}$ S. W.N.W. $\frac{1}{4}$ W.	Rate. $2\frac{1}{2}$ $2\frac{1}{2}$	E. $\frac{1}{4}$ N. W. $\frac{1}{4}$ S.	Rate. $1\frac{1}{2}$ $1\frac{1}{2}$
On a line joining Rockabill and the Calf of Man.	From Rockabill to the northward the stream sets fair, taking nearly the direction of the coast, and passes on to St. Johns Point, when it encounters the stream from the North Channel; near here the stream turns to the westward, and bends in taking the curve of Dundrum Bay, which must be guarded against.	Rockabill -	N. by E. S. by W.	1.0 $1\frac{1}{2}$	N.E. $\frac{1}{2}$ E. S.S.W.	$\frac{1}{2}$ $\frac{1}{2}$

## of the TIDAL STREAMS in the IRISH CHANNEL.

of the Stream.					Remarks on the Tides near the Land.	Position.
	$\frac{1}{2}$ over.		5 Miles.	From		
F	N.E. $\frac{1}{2}$	Rate. $2\frac{1}{2}$	N.E. $\frac{3}{4}$ E.	Rate. $3\frac{1}{2}$ to	The stream curves with the land, and the flood sets sharply into Cardigan Bay, sweeping more consequently an in-draught	On a line joining St. Davids Head and the Tuakar.
E	S.W. $\frac{1}{2}$ W.	$2\frac{1}{2}$	S.W. $\frac{3}{4}$ W.	$4$		
and more in as you near the land. There is into this bay on both ebb and flood.						
F	N.E. by N.	$3\frac{1}{2}$	N.N.E. $\frac{1}{2}$ E.	$3$	The stream curves sharply round Bardsey, and slacks 1h. 20m. in the Bardsey Sound before it does in the offing; the flood setting strong into Caernarvon, and the ebb strong into Cardigan Bay, and <i>vice versa</i> .	On a line joining Bardsey Island and the Arklow Light Ship.
E	S.W. $\frac{1}{2}$ S.	$3$	S.S.W. $\frac{1}{2}$ W.	$2\frac{1}{2}$		
F	N.N.E. $\frac{1}{2}$ E.	$2\frac{1}{2}$	N. by E. $\frac{1}{2}$ E.	$3\frac{1}{2}$	In passing Caernarvon Bay the stream curves with the bay more and more as you near the bight, setting into the bay on one side and out at the other end, near Holyhead Bay; the stream sets directly for the Skerries, sweeping into Holyhead Bay when inside a line, joining the North Stack and Skerries, and in the centre of the bay splits, one part setting sharply over the Platters and round Carmel Head, the other running for the Fenwick Rock and Penryn.	On a line joining Holyhead and Kish Light Ship.
E	S.W.	$2\frac{1}{2}$	S.W. $\frac{1}{2}$ S.	$3$		

first quarter ebb and flood, at first close in with the shore, and gradually increases in strength, extending to seaward in a direction between N.W. and W.S.W. from the lighthouse, according to time of tide; about the last quarter tide it begins to subside. With strong winds blowing against the tide, the race is heavy, especially about half tide, and even dangerous at that time to small deep laden vessels, so that they should either go outside altogether or pass between it and the Stack (close to the latter). North and N.W. winds occasion the heaviest seas; at a distance of 2 miles from the Stack the race is no longer felt, and by keeping the Skerries to the eastward of N.E. by E.  $\frac{1}{2}$  E. a vessel will pass outside of it. Off the North Stack also there is a race after half tide, and although not dangerous at any time, it had better be kept clear of in heavy weather, as the seas break short.

of the Stream.					Remarks on the Tides near the Land.	Position.
	$\frac{1}{2}$ over.		5 Miles.	From		
F	East	Rate. $2$	E. $\frac{1}{2}$ N.	Rate. $3$	From the Skerries the stream sweeps over the Coal Rock, and runs on thence to Lynus and Liverpool in nearly a direct line; but at 10 miles off shore it takes a more northerly direction, and strikes off for the Ribble and Morecambe Bay; near Lynus it curves to the southward, and runs for Priestholm and Great Orme Head; at half tide the stream slacks in Red Bay, and turns to the northward, and off Lynus meets the true tide, and forms a race.	On a line joining the Skerries and the Calf of Man.
E	W. by S.	$1\frac{1}{2}$	W. $\frac{1}{2}$ S.	$3$		
F	E. $\frac{1}{2}$ N.	$1\frac{1}{2}$	S.E. by E.	$2$	Near the Calf, and to the northward, the flood sets to the southward, and the ebb to the northward; between the Calf and Rockabill the stream is very slack, being scarcely perceptible midway.	On a line joining the Calf of Man and Rockabill.
E	W. by S.	$1\frac{1}{2}$	N.N.W. $\frac{1}{2}$ W.	$1\frac{1}{2}$		

TABLE showing the DIRECTION and RATE (at SPRINGS)

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.		$\frac{1}{2}$ over.		
On a line joining Calf of Man and Walney Island.	Near the Calf, and eastward to Langness Point, the stream runs strong, and near the land bends to the northward, and passes Douglass Head on to Maughold Head, where it is turned to the East and S.E. by the northern stream.	Calf of Man	E. $\frac{1}{4}$ N. W. $\frac{1}{2}$ N.	Rate. $3\frac{1}{4}$ $3\frac{1}{4}$	East West	Rate. 2 2	F E
On a line joining St. Johns Point and Peel (Isle of Man).	The streams from the north and south channels meet off St. Johns Point. Near the land the stream runs 2 knots at springs, but at a distance there is scarcely any tide. Off the mouth of Lough Strangford, on a south bearing, the outset will be felt at a distance of $3\frac{1}{2}$ miles, sweeping in a curve to the N.E. with the ebb, and to the S.W. with the first of the flood, forming a race: the outset continues to run 2 hours after low water.	St. Johns Point.	s.w. by w. $\frac{1}{4}$ w. N.E. by E.	$1\frac{1}{2}$ $1\frac{1}{2}$	S.W. $\frac{1}{4}$ W. N.E. $\frac{1}{4}$ N.	$0\frac{1}{2}$ Drain	F E
On a line joining Peel and Mull of Galloway.	- - -	Peel -	E. $\frac{1}{4}$ N. W. $\frac{1}{2}$ N.	1 $1\frac{1}{4}$	E. by S. W.N.W. $\frac{3}{4}$ W.	$1\frac{1}{4}$ $1\frac{1}{4}$	F E

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.		$\frac{1}{2}$ over.		
On a line joining the Point of Ayr and Burrow Head.	Near the Point of Ayr, in a N.N.W. direction, there is usually a race, especially on the ebb: it takes place upon a bank, which, although shallower than the parts about it, is not dangerous.	Point of Ayr	S.E. by E. $\frac{3}{4}$ E. W. by N.	Rate. $3\frac{1}{4}$ 3	E. $\frac{3}{4}$ S. W. by N.	Rate. $2\frac{3}{4}$ $3\frac{1}{4}$	F E
On a line joining the Point of Ayr and St. Bees Head.	- - -	Point of Ayr	S. $\frac{3}{4}$ E. N.N.W.	$2\frac{1}{4}$ $1\frac{1}{4}$	S. $\frac{3}{4}$ E. N.W. by N.	$2\frac{1}{4}$ 2	F E

On the line joining Point of Ayr and St. Bees Head are situated the White-stone and King William Banks, which are very dangerous. The tide sets immediately over them, S. by E.  $\frac{1}{2}$  E., at a rapid rate, and ought to be carefully guarded against.

The stream sets round the Point of Ayr into Ramsey Bay about the time of low water at Liverpool, and sweeps over the Bahama Bank, and from thence

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.		$\frac{1}{2}$ over.		
On a line joining Copeland Island and Mull of Galloway.	- - -	Copeland Island.	S. $\frac{1}{2}$ E. N. $\frac{1}{2}$ W.	Rate. 2 2	S. by E. $\frac{1}{2}$ E. N. by W. $\frac{1}{2}$ W.	Rate. 2 $2\frac{1}{2}$	F E

## Magnetic Direction and Rate of the

After High Water at Liverpool.

1 Hour.		2 Hours.		3 Hours.		4 Hours.		5 Hours.		6 Hours.	
Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
N. $\frac{1}{2}$ E.		North		N. by W. $\frac{1}{4}$ W.		N.N.W. $\frac{3}{4}$ W.		N.W. $\frac{1}{2}$ N.		S.W. $\frac{1}{4}$ W.	

Stream.				Remarks on the Tides near the Land.		Position.
} over.		5 Miles.	From			
E. by E. $\frac{1}{2}$ E. W.N.W.	Rate. $1\frac{1}{2}$	S.E. $\frac{1}{2}$ S. N.W. $\frac{1}{2}$ W.	Rate. 2	Walney Island.	The stream sets sharply round Walney Island into Morecambe Bay.	On a line joining Walney Island and the Calf of Man.
S. $\frac{1}{2}$ E. Slack	$0\frac{1}{2}$	S. $\frac{1}{2}$ W. N. $\frac{3}{4}$ W.	$1\frac{1}{2}$ $1\frac{1}{2}$	Peel	To the N.W. of Peel the stream divides; one part runs towards the Calf,	On a line joining Peel and St. Johns' Point.
<p>the other turns to the N.E., passes Contrary Head, so called from the set of the tides off it, and runs with an increasing rate along the land to Jurby, and thence to the Point of Ayr.</p>						
S.E. $\frac{1}{2}$ E. by W. $\frac{3}{4}$ W.	$2\frac{1}{2}$ $2\frac{1}{2}$	E.S.E. $\frac{1}{2}$ E. N.W. by W.	$3\cdot0$ $3\frac{1}{2}$	Mull of Gal- loway.	Off the Mull of Galloway the stream attains its greatest strength, and occasions a race off the head; but there is usually a slack very close	On a line joining Mull of Galloway and Peel (Isle of Man).
<p>be shore, of which steamers who are acquainted take advantage. Between the Mull and row Head the stream bends to the northward, and finally takes the curve of the bay of e, setting sharply into the bay round the Mull, and out round Burrow Head.</p>						

Stream.		From	Remarks on the Tides near the Land.	Position.
5 Miles.				
East N.W. $\frac{3}{4}$ W.	Eate. 4 4	BurrowHead	- - - - -	On a line joining Burrow Head and Point of Ayr.
S.E. by S. W. $\frac{1}{4}$ N.	1 $\frac{1}{2}$	St. Bees Head	Between King William Bank and St. Bees Head the stream is slack, but near St. Bees begins to run, one part passing up the Solway, the other going on towards Walney.	On a line joining St. Bees Head and Point of Ayr.

ses on to Maughold Head, where it meets with the tide from the southern  
wnel. At half flood the stream at the Bahama runs towards Ramsay, and then  
ns to the north-west the rest of the tide.\* A few miles westward of this spot,  
latitude 54° 18' N. and longitude 4° W., the streams from the Calf of Man,  
l that which had passed over the Whitestone Bank, meet and thence run  
ctly for Walney Island.

Team.		Remarks on the Tides near the Land.	Position.
S Miles.	From		
E. $\frac{1}{2}$ E	Rate. 3	- - - - -	On a line joining Mull of Galloway and Cope-land Island.
W. $\frac{1}{2}$ W.	3		

the Bahama Light Vessel.

**Before High Water at Liverpool.**

4 Hours.		3 Hours.		2 Hours.		1 Hour.	
Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.
	S. $\frac{1}{2}$ W.		S.W.		N.W. $\frac{1}{4}$ W.		N. by E. $\frac{1}{4}$ E.

\* See Bahama Light Vessel.

TABLE showing the DIRECTION and RATE (at SPRING)

## Copeland Islands and Lough of Belfast.

The main body of the stream, ebb and flood, crosses the entrance of this Lough in a curve from the Copeland Islands to Blackhead, and near the islands gains strength of 5 knots; this curve bends more and more in until it stretches from Whitehead to Grey Point, when it divides, one part of the flood running up Garmoyle, the other bending back and running towards Orlock, and near that place will carry a vessel upon the Briggs if not guarded against.

The first of the flood sets through the Copeland Sound and between the islands at a rapid rate, and care must be taken not to be swept into the intricate pass between the Copeland Islands. At half tide all the inshore part of the tide within  $1\frac{1}{2}$  miles of the coast south of the Copelands slackens, and shortly turns to northward and runs for 3 hours, whilst the stream in the offing is still going to the southward; so that from Ballyferris Point to Foreland Point, quite close in, the stream runs 9 hours to the northward and only 3 to the southward.

Position.	Remarks on the Tides near the Land.	Magnetic Direction.			
		From	5 Miles.	$\frac{1}{2}$ over.	Rate.
On a line joining Corsewall Point and Sanda Sound.	Near Corsewall the stream gains strength, and close in takes the curve of the land, the flood setting to the S.W. round the lighthouse, and the ebb <i>versé</i> .	Corsewall Point.	S. $\frac{1}{2}$ E. N.N.W.	Rate. $1\frac{1}{2}$ $1\frac{1}{2}$	S.E. $\frac{1}{2}$ S. N.W. $\frac{1}{2}$ N. $1\frac{1}{2}$
On a line joining Muck Island and Corsewall Point.	Close to Muck Island the stream attains great strength, the flood turning round Blackhead into the Lough of Belfast, but at a few miles off shore it runs straight on to the Copeland Islands.	Muck Island.	S. by E. $\frac{1}{4}$ E. N. by W. $\frac{1}{4}$ W.	$1\frac{1}{2}$ $1\frac{1}{2}$	S. by E. $\frac{1}{4}$ E. $1\frac{1}{2}$ N. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$

The tides off Muck Island run from  $3\frac{1}{2}$  to  $4\frac{1}{2}$  knots close in, and occasion a high and heavy breaking sea at the springs; and in blowing weather there are runs also off both Blackhead and Whitehead, and also the Gobbins; with the ebb there is an eddy from half tide, close in with the shore, which may be to the advantage of by steamers at all times, and by sailing-vessels with a leading wind, but it does not extend sufficiently far off for sailing-vessels to benefit by it in a working wind, as they would be in danger of getting on the rocks if they missed stays.

Position.	Remarks on the Tides near the Land.	Magnetic Direction of the Stream.			
		From	$\frac{1}{2}$ over.	$\frac{1}{2}$ over.	Rate.
On a line joining Tor Point and Mull of Cantyre.	Close off Tor Point the flood runs upwards of four knots at springs.	Tor Point	S. by E. N. by W.	Rate. 4 $3\frac{1}{2}$	S. by E. $\frac{1}{4}$ E. 4 N. by W. $\frac{1}{4}$ W. $3\frac{1}{2}$

**TIDAL STREAMS in the IRISH CHANNEL—continued.**

3rd quarter of the flood having turned to the northward, meets the tide in the Sound off the Deputy Reef, and they jointly strike off for the south of the Copeland Islands and pass over the Bushes, and thence through the channel between the Islands.

An eddy under Mew Island at this time rushes with great speed to the north until it meets the true tide, and with it forms a race which sailing-vessels should avoid; upon the ebb a similar race occurs, but to the N. E. of Mew Island.

At the last of the flood goes to the northward through the Sound, and splits off at the north end of the Copeland, and one part runs for Mew Island, throwing off eddies between the islands.

About the Copeland Islands the eddies are very strong, and at night a vessel should be sure that she is outside the drift of the point of Mew Island.

Stream.		From	Remarks on the Tides near the Land.	Position.
S Miles.	Rate.			
E.S.E. W. by W.	1 1/2 1 3/4	Sanda Island	The tide runs fast past Sanda Island, and is variable in its direction. Off the western end of the island it splits; the outer part passing on for the Clyde, and the other going inside the island, and up Kilbrennen Sound, as mentioned below.	On a line joining Sanda Island and Corsewall Point.
S. 1/4 E. S. 3/4 W.	1 1/2 1 3/4	Corsewall Point.	- - - - -	On a line joining Corsewall Point and Muck Island.

After passing Whitehead, the tide slacks considerably as you enter the Lough. At the flood there is a strong eddy under Muck Island, which will be found useful to steamers and even sailing-vessels beating along this coast; with a heavy wind they will do well to keep close in with the shore hereabout, as the strength of the flood strikes off from Muck Island in a S. E. direction, till it meets the stream which passes the eastern side of the Maidens, when it takes a channel direction; the meeting of these two tides appear to have occasioned a deep ditch, which will be found from 90 to 100 fathoms water.

Remarks on the Tides near the Land.	Position.
At the Mull of Cantyre the stream runs 5 knots, and occasions a heavy dangerous sea in bad weather; with either tide, quite close in, there is an eddy. At the Mull of Cantyre the flood takes a direction nearly for Sanda Island, and divides off its western end: one part passing inside the island and up Kilbrennen Sound, the other running on for the Clyde.	On a line joining Mull of Cantyre and Tor Point.



## THE TIDES NEAR RATHLIN ISLAND.

BY RICHARD HOSKYN, MASTER R.N.,

In charge of the Survey on the North-east Coast of Ireland.

- Rate of tide.* ABOUT Rathlin Island the tides are very rapid, in the Sound they run from 4 knots at neaps to  $6\frac{1}{2}$  knots at springs, occasioning strong eddies along the shores, with heavy overfalls off all the headlands.
- Eddy from Tor Point through the Sound.* On each side of Tor Point there is an eddy which at half tide gradually extends from the shore, at the last quarter of the Channel flood this eddy goes to the westward through Rathlin Sound, causing the stream to make there  $1\frac{1}{2}$  hours sooner than it does to the northward of the island; by taking advantage of these eddies a ship from southward may carry 9 hours tide with her through Rathlin Sound.
- Eddy on south shore.* To the westward of Fair Head all along the south shore of the Sound as far as Sheep Island there is an eddy with both streams, commencing at half tide. Carrickvaan Rock lies at the junction of the eddy and streams.
- Ebb stream.* During the first hour and half, the ebb stream sets round the Point into Church Bay, but after high water at Liverpool, when the general stream north of the island has made to the westward, and it has attained a rate of  $6\frac{1}{2}$  knots through the Sound, an eddy begins in Church Bay, setting from the Bull Point towards the Rue, and meeting the true tide about a mile to the westward of the latter, where the bottom is very irregular, a great overfall is occasioned, called Slough-na-rue, which may be attended with danger to small vessels.
- Dangerous overfall.* The eddy from Church Bay has now forced the main stream in a more southerly course, with contracted limits it sets from Rue Point towards the Carrickvaan Rock, whence it shoots off in a N.W. direction towards the Bull Point at the west end of Rathlin, meeting there the stream from the north side of the island setting to the S.W.
- Direction of ebb.* The flood or eastern stream does not begin in the middle of the Sound until it is low water at Liverpool, although, as before observed, the ebb commences along the south shore commences at half tide. There is no slack water preceding the flood stream; in the eastern part of the Sound at low water it sets south  $2\frac{1}{2}$  knots, in the western part at the same moment it sets north  $1\frac{1}{2}$  knots, eddying round at each station in opposite directions. The stream soon becomes general, setting fair through the Sound, rushing out of Church Bay past the Rue with great force, including the eddy before alluded to, it sets for 10 hours across Church Bay to the westward. During the flood stream there is an eddy to the eastward of the island, extending  $2\frac{1}{2}$  miles from the shore, setting back on the island at the junction of the eddy and true streams there are great overfalls at Altacarry Head, and again off the Rue as mentioned above.
- Flood stream.* With a commanding breeze there is no danger in the navigation of Rathlin Sound, but in light winds great vigilance is necessary to avoid being caught in the eddies or overfalls.
- Eddy to eastward of Island.* Off Bengore Head, at a mile distant, the stream turns about 15 miles after high and low water at Liverpool; springs run 3 knots, the ebb setting W.N.W. and the flood E. b. S. In the bays on each side of the island an eddy begins when the stream in the offing has run half its course.
- Navigation of Sound.*
- Streams off Bengore Head.*

erry Islets the *ebb stream* sets fair through the anchorage to the westward, attaining a velocity of 3 to  $3\frac{1}{2}$  knots in between Ramore Head and the Carr Rocks, and creating a desolate sea.

*Streams near the Sherry Islet.*

The stream sets from Ramore Head towards the Carr Rocks; and is entered it sets fair through.

Sound it sets down on the Little Skerry, while the ebb runs northward through the Sound.

In anchorage under the Great Skerry there is little tide felt, and it is slack water at half tide, on the ebb with the last ebb on the north side of the rocks the stream runs with a velocity of 1 knot.

To proceed to the westward towards Lough Foyle the tide loses strength, north of the mouth of the Bann, 3 miles off shore the rate at springs is  $1\frac{3}{4}$  knots.

*To the westward.*

An eddy tide all the way along the shore from the Skerry to the mouth of the Bann, commencing at half tide, the line of eddy with the main stream being marked by a strong rippling.

*Eddy.*

South of Port Stewart the channel stream turns to the eastward an hour and 40 minutes after low water at Liverpool, or at low water on the adjoining shore, and to the westward 31 minutes before low water at Liverpool, or three quarters of an hour before low water on the adjoining shore, so that, on this part of the coast, the tide (reference to its head at Liverpool) being nearly reversed, (what to a person watching the rise and fall of the tide appears at first sight so anomalous) the whole of the ebb comes from the ocean, while the flood comes from the opposite

*Off Port Stewart.*

*High and low water not occasioned by tidal stream,*

the tidal stream to the head of the tide at Liverpool, and at times of high water to the undulation of the tide wave, the anomaly disappears.

*but by tidal wave.*

Coast to the westward of Fair Head is subject to a ground swell. In fine weather the commencement of the east-going stream is marked by the sudden appearance of the swell, resuming again its quiet state of quiet when the west-going stream makes.

*Ground swell.*

## SECTION II.

THE TIDAL STREAMS OF THE ENGLISH CHANNEL, WITH T.  
SHOWING THEIR COURSE AND RATE AT EVERY HOUR OF THE  
AT DOVER.

*Streams turn  
with the tides of  
Dover.*

IN the English Channel, as before stated (page 120), the time of water at *Dover* is to be taken as the standard, so that whenever the time of the turn or the direction of the stream is required known, the time of the ship is to be compared with the time of water for the day at the standard place, and the interval sought table which accompanies these remarks, and in the column answer the ship's position will be found the information required.\*

*Tidal Compart-  
ments.*

In these tables it has been necessary to class the information heads answering to the various compartments of the Channels, courses of the stream in the mixed tides are so changeable that different stream will be found running at a place but little removed another in the same portion of the Channel. The seaman must fore look in which compartment according to his latitude and longitude his ship is sailing, and in which quarter of that compartment, N.E., N.W., S.E., or S.W., and then enter the table for the direction of the stream.

*1st Compart-  
ment.*

The 1st compartment, as previously stated (page 120), comprises approach to the English Channel *westward of a line joining and Scilly*.

*2d Compart-  
ment.*

The 2d compartment comprises a space eastward of the mentioned line from Ushant to Scilly, and as far as a *line joining Start and the Casquets*. In this part of the Channel there is a tide, partaking of the joint directions of the Channel and streams.

*3d Compart-  
ment.*

The 3d compartment is bounded on the west by the line joining Casquets and the Start, and on the east by a line from *Beach to Dieppe*, having the Baie de la Seine on the south. As soon as a vessel passes to the eastward of the Start and Casquets she gets the true Channel stream which sets straight up and down Channel the fairway, and will always carry a vessel *towards Beachy Head* the water is *rising at Dover*, and *from it* while it is *falling there*.

*4th Compart-  
ment.*

The 4th compartment comprises the Gulf of St. Malo, and which from its magnitude and large tides exercises a powerful influence over the navigation of that part of the Channel in its immediate vicinity and the seaman must be especially on his guard when drawing near this locality. With the *falling water* at Dover the stream sets *into this Gulf* on both sides,† which the prevalence of westerly is said to increase, and with the *rising water* at Dover it sets *across out of the Gulf*, the north-eastern part of the stream sweeping the Casquets towards Alderney, and through the Russell and Channels about Guernsey towards the race of Alderney.

*5th Compart-  
ment.*

The 5th compartment contains the great bight on the south of the Channel eastward of Cape Barfleur, known as the Baie de la With the *rising water* at Dover the stream sets sharply round Barfleur *into the bay*, curving more and more as the depth of tide is gained until it finally takes the sweep of the shore. With the tide the western half of the bay is partly in eddy, and the tide in all that part nearly an hour before high water at Dover, whilst in the eastern half of the bay it runs about half an hour longer than at

\* The time at ship is to be corrected for the longitude of Dover.

† A return of the vessels wrecked on the Channel Islands shows that the part of them came ashore about the end of the falling water at Dover.

ere a ship beating up Channel towards the end of a rising tide may prolong the tide in her favour by standing close over French Coast eastward of Havre. On approaching Boulogne, at the beginning of a *rising tide*, great attention should be the direction in the tables, as the streams hereabout meet and d down upon the French Coast, so that a ship, which on the side would at this time have a stream setting straight up here encounters one upon her beam, sweeping her down the Somme, and hence probably the cause of some of the astrous losses which have occurred in this part of the Channel.

6th Compartment.

h compartment is between Beachy Head and the North Foreland the Somme and Dunkerque. In this space the streams from the North Sea *meet* while the water is *rising* at Dover, and while it is *falling* there. The point of union and separation is ever, stationary, but moves from west to east both on the d falling water. For instance, an hour after high water at separation begins off Beachy Head; in two hours it has reached in three hours Rye, and so it creeps on until at low water it has the line extending from the North Foreland to Dunkerque. At the offing streams on both sides have done, and it is slack water the North Sea and English Channel as far as the true tide but the stream does not at this time cease in the intermediate tide. water at Dover begins to rise, the stream on either side sets *Dover*, and that from the North Sea consequently *goes with the tide*, which had not yet ceased running to the westward, other, the Channel stream, *opposes* it, and this opposition conoughout the rising tide at Dover; the point of meeting gradually s position eastward as the tide advances on the shore.\* About when the water at Dover has done rising, the line of meeting has he North Foreland, and the streams are now slack over the east and west, leaving the intermediate stream running alone to the eastward. The next hour finds the offing streams made ; and west, so that now the intermediate stream falls in with Sea stream and goes with it, whilst on the west it separates Channel stream, splitting at the same point, Beachy Head, as

the general description of the course and routine of the tidal f the English Channel and intermediate tide, a careful perusal will enable the reader the more readily to understand the and tables annexed.

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ice of *meeting* begins off Beachy Head at *five hours before* high water on the that of the *separation* at *one hour after* high water; the place of *four hours* water is nearly the same as that of the *separation* at *two hours after*; and with the subsequent hours.

## TIDAL STREAMS

TABLE showing the MAGNETIC DIRECTION of the STREAM in the ENGLISH CHANNEL at every HOUR of the TIDE at DOVER.

## COMPARTMENT I.

*Westward of a Line joining Ushant and the Land's End.*

Hours.	North Side of Latitude 49°00' N.						REMARKS.	South Side of Latitude 49°00' N.
	West part.	Rate.	Near Scilly.	Rate.	Seven Stones.	Rate.		
After High Water, Dover.	1 W.N.W. $\frac{1}{4}$ W.	Greatest rate, springs, 1°50' knots.	N.N.W. $\frac{1}{2}$ W.	Greatest rate, springs, 1°50' knots.	N. $\frac{1}{4}$ W.	Greatest rate, springs, 1°50' knots.		W.
	2 N. $\frac{1}{2}$ W.		N. $\frac{1}{4}$ W.		N.N.E.			N. by W.
	3 N.E. $\frac{1}{4}$ E.		N.N.E.		N.E. $\frac{1}{4}$ N.			E.N.E.
	4 E.N.E. $\frac{1}{4}$ E.		N.N.E.		N.E. $\frac{1}{4}$ E.			E.N.E.
	5 E.N.E. $\frac{1}{4}$ E.		N.E. by E.		N.E. $\frac{1}{4}$ E.			N.E. by E.
	6 E. $\frac{1}{4}$ S.		E. $\frac{1}{4}$ S.		E.N.E. $\frac{1}{4}$ E.			Tur.
Before High Water, Dover.	5 S.E. by E. $\frac{1}{4}$ E.	Greatest rate, springs, 1°50' knots.	-	Greatest rate, springs, 1°50' knots.	S. $\frac{1}{4}$ W.	Greatest rate, springs, 1°50' knots.		S. by E.
	4 S. $\frac{1}{2}$ E.		South.		S.S.W. $\frac{1}{4}$ W.			Dra.
	3 S.S.W. $\frac{1}{4}$ W.		S.W.		S.S.W. $\frac{1}{4}$ W.			S.W.
	2 S.W. by W.		S.W. by W.		S.W. $\frac{1}{4}$ S.			S.W.
	1 W.S.W. $\frac{1}{4}$ W.		S.W. by W.		W.S.W.			S.W. by W.

## COMPARTMENT II.

Between { A Line joining the Land's End and Ushant,  
" " the Casquets and Start, and  
" " the Casquets and Sept Iles.

Hours.	North Side of the Channel.						REMARKS.	South Side of the Channel.		
	West part.	Rate.	Centre.	Rate.	East part.	Rate.		West part.	Rate.	Centre.
After High Water, Dover.	1 W.N.W. $\frac{1}{4}$ W.	Greatest rate, springs, 2°00' knots.	W. $\frac{1}{2}$ N.	Greatest rate, springs, 2°00' knots.	W. $\frac{1}{2}$ N.	Greatest rate, springs, 2°00' knots.	{ W. $\frac{1}{2}$ S. near Hurd's Deep. }	W. $\frac{1}{4}$ S.	Greatest rate, springs, 1°50' knots.	W. $\frac{1}{4}$ N.
	2 Turning.		n.w. by w. $\frac{1}{4}$ w.		W. $\frac{1}{4}$ N.			Slack.		West.
	3 N. $\frac{1}{4}$ E.		W. $\frac{1}{4}$ N.		West.			East.		Slack.
	4 E. $\frac{1}{4}$ S.		Slack.		S. $\frac{1}{4}$ W.			E. by N.		E.S.E. $\frac{1}{4}$ E.
	5 East.		E. $\frac{1}{4}$ S.		S.E. $\frac{1}{4}$ S.			E.N.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.
	6 E. by S.		E. $\frac{1}{4}$ S.		E.S.E. $\frac{1}{4}$ E.			E. $\frac{1}{4}$ N.		s.e. by e. $\frac{1}{4}$ e.
Before High Water, Dover.	5 E.S.E. $\frac{1}{4}$ E.	Greatest rate, springs, 2°00' knots.	E. by S.	Greatest rate, springs, 2°00' knots.	E. by S.	Greatest rate, springs, 2°00' knots.		E. $\frac{1}{4}$ S.	Greatest rate, springs, 1°50' knots.	E. by S.
	4 Slack.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.			n.e. by e. $\frac{1}{4}$ e.		Slack.
	3 Turning.		Slack.		E. $\frac{1}{4}$ S.			Slack.		W.N.W.
	2 W. by N.		W. $\frac{1}{4}$ N.		Turning.			s.w. by w. $\frac{1}{4}$ w.		Slack.
	1 W. $\frac{1}{4}$ S.		W. $\frac{1}{4}$ N.		W.S.W. $\frac{1}{4}$ W.			S.W. by W.		W. by N.

## COMPARTMENT III.

Between { A Line joining Start and Casquets, and  
" " Point Ailly and Beachy Head.

Hours.	West part.	Rate.	Centre.	Rate.	East part.	Rate.	REMARKS.	Over Hurd's Deep.	Rate.
After High Water, Dover.	1 W. $\frac{1}{4}$ N.	Greatest rate, flood 3°00' knots, ebb 2°40' knots.	W.N.W. $\frac{1}{4}$ W.	Greatest rate, flood 3°00' knots, ebb 2°40' knots.	Turning.	Greatest rate, flood 3°00' knots, ebb 2°40' knots.		W. $\frac{1}{4}$ S.	Greatest rate, flood 2°15' knots, ebb 2°40' knots.
	2 W.N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.			W. $\frac{1}{4}$ S.	
	3 W. $\frac{1}{4}$ N.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.			W. $\frac{1}{4}$ S.	
	4 W. $\frac{1}{4}$ S.		W.N.W.		W. $\frac{1}{4}$ N.			W.S.W.	
	5 W. $\frac{1}{4}$ S.		W.N.W.		W. by N.			W.S.W. $\frac{1}{4}$ W.	
	6 N.N.E. $\frac{1}{4}$ E.		W.N.W. $\frac{1}{4}$ W.		W. by N.			Slack.	
Before High Water, Dover.	5 E. $\frac{1}{4}$ S.	Greatest rate, springs 2°00' knots.	E.S.E.	Greatest rate, springs 2°00' knots.	E.S.E. $\frac{1}{4}$ E.	Greatest rate, springs 2°00' knots.		E. $\frac{1}{4}$ S.	Greatest rate, springs 2°00' knots.
	4 E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.			E. $\frac{1}{4}$ S.	
	3 E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.			E. $\frac{1}{4}$ S.	
	2 E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.			E. $\frac{1}{4}$ S.	
	1 E.S.E. $\frac{1}{4}$ E.		E.S.E.		E. $\frac{1}{4}$ S.			E. $\frac{1}{4}$ N.	
								E.N.E.	

## COMPARTMENT IV.

Entrance of Gulf of St. Malo on a line joining Brehat Island and S.W. line of Guernsey Island.

Hours.	12 miles from Brehat Island.		12 miles from Guernsey Island.		REMARKS.	Near S.W. Point, Guernsey Island.		4 miles W. by S. from Casquets.		4 miles W.N.W. of Cape La Hague.	
	Course.	Rate.	Course.	Rate.		Course.	Rate.	Course.	Rate.	Course.	Rate.
Water rising Dover.	1 N.W. by W.	Greatest rate, springs, uncertain knots.	W. $\frac{1}{4}$ N.	Greatest rate, springs, uncertain knots.		W. $\frac{1}{4}$ N.	Greatest rate, springs, uncertain knots.	W. $\frac{1}{4}$ S.	knots.	S.W. by W. $\frac{1}{4}$ W.	Greatest rate, springs, 5 to 7 knots.
	2 S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.			S.S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ W.		S.W. by W. $\frac{1}{4}$ W.	
	3 S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.			S.S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ W.		S.W. by W. $\frac{1}{4}$ W.	
	4 S.E. $\frac{1}{4}$ S.		S.S.E. $\frac{1}{4}$ E.			S.E. by E. $\frac{1}{4}$ E.		S. by E. $\frac{1}{4}$ E.		S.W. $\frac{1}{4}$ S.	
	5 S.E. $\frac{1}{4}$ S.		S.E. $\frac{1}{4}$ E.			S.E. by E. $\frac{1}{4}$ E.		S.E. $\frac{1}{4}$ E.		S.W. $\frac{1}{4}$ S.	
	6 S.E. $\frac{1}{4}$ S.		S.E. $\frac{1}{4}$ S.			S.E. by E. $\frac{1}{4}$ E.		S.E. $\frac{1}{4}$ E.		N.E. by E. $\frac{1}{4}$ E.	
Water falling Dover.	3 S.E. $\frac{1}{4}$ E.	Greatest rate, springs, uncertain knots.	S.E. by E.	Greatest rate, springs, uncertain knots.		{ S.E. by E. $\frac{1}{4}$ E. E. $\frac{1}{4}$ N. S.E. by E. $\frac{1}{4}$ E. E. $\frac{1}{4}$ N.	Greatest rate, springs, uncertain knots.	E. $\frac{1}{4}$ N.	Greatest rate, springs, uncertain knots.	N.E. by E. $\frac{1}{4}$ E.	Greatest rate, springs, 5 to 7 knots.
	4 ..		..			..		N.E. $\frac{1}{4}$ N.		N.E. by E. $\frac{1}{4}$ E.	
	5 N.W. by W.		N.W. $\frac{1}{4}$ N.			..		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.	
1	N.W. by W.		N.W. $\frac{1}{4}$ W.			N. by W. $\frac{1}{4}$ W.		N.E. by E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.	
2	N.W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.			N. by W. $\frac{1}{4}$ W.		N.W. $\frac{1}{4}$ W.		N.E. $\frac{1}{4}$ N.	

## COMPARTMENT V.

In the Baie de la Seine, south of a line joining Cape Barfleur and Cape Antifer.

Hours.	West Part.	Rate.	Centre.	Rate.	East Part.	Rate.	REMARKS.
After High Water, Dover.	1 N.N.W. $\frac{1}{4}$ W.	Greatest rate, flood springs, 4 20 } ebb 3 70 } knots.	N.W. by W. $\frac{1}{4}$ W.	Greatest rate, flood springs, 3 20 } ebb 3 20 } knots.	W. $\frac{1}{4}$ N.	Greatest rate, flood springs, 3 30 } ebb 3 00 } knots.	
	2 N.N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		
	3 N.N. W.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.		
	4 N.N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ N.		
	5 N. by W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ N.		
	6 Slack.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		
Before High Water, Dover.	5 S.S.E.	Greatest rate, flood springs, - } ebb - } knots.	S.E. by E. $\frac{1}{4}$ E.	Greatest rate, flood springs, - } ebb - } knots.	W. $\frac{1}{4}$ S.	Greatest rate, flood springs, - } ebb - } knots.	
	4 S.S.E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
	3 S.S.E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
	2 S.E. by S.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
	1 S.E. by S.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		

## COMPARTMENT VI.

Between { A line joining Beachy Head and Point Ailly, and  
" the North Foreland and Dunkerque.

1.	REMARKS.	West of	East of	Off Southsland Head.		Off Northsland Head.	
		Line of Separation.		Course.	Rate.	Course.	Rate.
1	The Tides separate on a line joining— Beachy Head and St. Valery . . . . .	W. by N.	N.E. by E. $\frac{1}{4}$ E.	N.E. $\frac{1}{4}$ E.	Greatest rate, springs, 3 3 knots.	N.N.E.	
2	Hastings and Treport . . . . .	W. $\frac{1}{4}$ N.	N.E. by E. $\frac{1}{4}$ E.	N.E. $\frac{1}{4}$ E.		N.N.E.	
3	Hastings and Cayeux . . . . .	W. $\frac{1}{4}$ N.	E.N.E.	N.E. by E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ E.	
4	Folkstone and Calais . . . . .	W. by S.	E.N.E.	N.E. by E. $\frac{1}{4}$ E.		E. by S.	
5	South Foreland and Point Gravelines . .	s.w. by w. $\frac{1}{4}$ w.	N.E. by E. $\frac{1}{4}$ E.				
6	Ramsgate and Nieuport, passing over North Sand Head, the South Line of the Falls, and the banks off Nieuport . . . . .	W. by S.	{ E. $\frac{1}{4}$ N. and Northward.	S.W. $\frac{1}{4}$ S.		S.S.W.	
7	The Tides meet on a line joining— Beachy Head and Point Ailly . . . . .	Tides meet.		E.S.E.	s.w. by w. $\frac{1}{4}$ w.	S.S.W.	
8	Bexhill and Cayeux, both streams turning down towards the "Somme" . . . . .	S.S.E. $\frac{1}{4}$ E.	S. by W. $\frac{1}{4}$ W.	S.W. $\frac{1}{4}$ W.		S.S.W.	
9	The Tides meet on a line joining Rye and the Somme, passing over the Bassurelle, both tides setting to the Somme . . . . .	S.E. by E. $\frac{1}{4}$ E.	S.W. by W.	W.S.W. $\frac{1}{4}$ W.		S.S.W.	
10	The Tides meet on a line joining— Dungeness and Touquet Point . . . . .	E. by N.	W.S.W. $\frac{1}{4}$ W.	W. $\frac{1}{4}$ N.		S.S.W.	
11	Do. Dover and Dunkerque nearly . . . . .	N.E. by E. $\frac{1}{4}$ E.	W.S.W.	N.N.E.		S.S.W.	

## SECTION III.

## TIDAL STREAMS IN THE NORTH SEA.

*Streams turn  
with the Tides  
of Dover.*

IN the North Sea the general features of the streams correspond exactly with those of the English Channel, but the *direction* of the stream is reversed. As soon as the intermediate tide is passed, on coming from the westward, a ship enters the True Stream, which extends from the North Foreland to a line joining the Leman and Ower Light on the Texel. To the northward between the Ower and Texel a mixed tide occurs, similar to that which is experienced off the Start, occasioned by the channel stream encountering that of the Offing Stream; and beyond these limits the time of slack water varies with the advance of the tidal hour, as at the entrance of the English Channel; and with this peculiarity also, that in a very short distance there occurs a difference of three hours in the time of slack water.

*Direction of  
True Stream.*

The True Stream will always carry a vessel *towards* the North Foreland while the water is *rising at Dover*, and *from it* while it is *falling at the place*.\* This stream sets nearly N.E. and S.W., except near the coast where it partakes of the form of the land; and at the entrance of the Thames where it is diverted from its course by the river. The annexed table will show these deviations and the exact course of the stream in the channel, which, for the convenience of reference, is also divided into compartments.

*North Sea  
divided into 15  
Compartments.*

The 7th compartment comprises the entrance to the Thames; viz. at the Mouse, Sunk, Kentish Knock, and Galloper Light Vessels, at 5 miles north of the North Foreland.

The 8th compartment comprises a space between the mouth of the Thames and the coast of the Netherlands south of 52° N.

The 9th compartment comprises between 52° and 53° N. and the English coast as far as 2° E. and also the Shipwash, Stanford, St. Nicholas Gat, Cockle, Newarp, and Hasborough Light Vessels.

The 10th compartment comprises between 52° and 53° N. and from 2° to 3° E.

The 11th compartment comprises between 52° and 53° N., and from 3° to 4° E.

The 12th compartment comprises between 52° and 53° N., and from 4° E. to the coast of the Netherlands.

The 13th compartment comprises between 53° and 54° N., and from 1° to 3° E., and the Leman and Ower Light Vessel.

The 14th compartment comprises between 53° and 54° N., and from 3° to 5° E.

The 15th compartment comprises between 53° and 54° N. and westward of 1° E., and the Spurn and Dudgeon Light Vessels.

The 16th compartment comprises from 1° to 8° E. on the parallel 54° N.

The 17th compartment comprises from 0° to 8° E. on the parallel 55° N.

The 18th compartment comprises from 1° to 8° E. on the parallel 56° N.

The 19th compartment comprises from 2° W. to 8° E. on the parallel of 57° N.

The 20th compartment comprises from 3° W. to 3° E. on the parallel of 58° N.

The 21st compartment comprises from 2° W. to 0° on the parallel 59° N.

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\* Upon the banks lying towards the coast of Holland, between the Texel and Schelde, where there is scarcely any rise or fall of the water, the stream continues nearly 40 minutes longer than in other parts of the channel.

TABLE showing the MAGNETIC DIRECTION of the TIDAL STREAMS in the NORTH SEA from a line joining the SPURN POINT and HELGOLAND to the NORTH FORELAND at every hour of the tide at DOVER.

## COMPARTMENT VII.

Entrance to the Thames.

Hours.	Mouse Light Ship.		Sunk Light Ship.		Kentish Knock Light Ship.		5 Miles north of North Foreland.		Gallopier Light Vessel.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 W. by N.		Slack.		N.E.		N.N.W. $\frac{1}{2}$ W.	1'80	N.E. $\frac{1}{2}$ E.	
	2 Slack.		N.E. by E. $\frac{1}{2}$ E.		N.E.		N. $\frac{1}{2}$ E.	1'20	N.E. by E.	
	3 E. $\frac{1}{2}$ S.		E.N.E. $\frac{1}{2}$ E.		N.E.		N.E. $\frac{1}{2}$ E.	1'18	N.E. by E.	
	4 E. $\frac{1}{2}$ S.		E.N.E. $\frac{1}{2}$ E.		N.E.		E.S.E. $\frac{1}{2}$ E.	1'46	N.E. $\frac{1}{2}$ E.	
	5 E. $\frac{1}{2}$ S.		E.N.E. $\frac{1}{2}$ E.		N.E.		E.S.E. $\frac{1}{2}$ E.	1'60	N.E. by E.	
	6 E. $\frac{1}{2}$ S.		E.N.E. $\frac{1}{2}$ E.		N.E.		S.E. $\frac{1}{2}$ E.	1'45	N.E. by E.	
Before High Water, Dover.	7 E. $\frac{1}{2}$ S.		..		S.W. $\frac{1}{2}$ S.		S.S.E. $\frac{1}{2}$ E.	1'30	S. $\frac{1}{2}$ W.	
	8 Slack.		S.W. by W. $\frac{1}{2}$ W.		S.W. $\frac{1}{2}$ S.		S. $\frac{1}{2}$ W.	1'36	S.W. $\frac{1}{2}$ S.	
	9 W. $\frac{1}{2}$ S.		S.W. by W. $\frac{1}{2}$ W.		S.W. $\frac{1}{2}$ S.		S.W. $\frac{1}{2}$ S.	1'60	S.W. by W.	
	10 W. $\frac{1}{2}$ S.		W.S.W. $\frac{1}{2}$ W.		S.W. $\frac{1}{2}$ S.		S.W. $\frac{1}{2}$ W.	1'65	s.w. by w. $\frac{1}{2}$ w.	
	11 W. $\frac{1}{2}$ S.		W. $\frac{1}{2}$ S.		S.W. $\frac{1}{2}$ S.		W.S.W.	1'40	W.S.W.	

## COMPARTMENT VIII.

Between the mouth of the Thames and the coast of the Netherlands south of  $52^{\circ}$  N. latitude.

Hours.	West of $2^{\circ}$ E.		Between $2^{\circ}$ and $3^{\circ}$ E.		East of $3^{\circ}$ E.		REMARKS.
	Course.	Rate.	Course.	Rate.	Course.	Rate.	
After High Water, Dover.	1 N.E. $\frac{1}{2}$ E.		E.N.E. $\frac{1}{2}$ E.		N.E. by E. $\frac{1}{2}$ E.		Stream from the Schelde N.W. by W. to $3^{\circ}$ E. turning sharply to N.E. Stream from the Schelde N.W. by W. to $2^{\circ}30'$ E. turning sharply to N.N.E. $\frac{1}{2}$ E.
	2 N.E. $\frac{1}{2}$ E.		E.N.E.		N.E. by E.		
	3 N.E.		N.E.		N.E. $\frac{1}{2}$ E.		
	4 N.E. by E. $\frac{1}{2}$ E.		N.E. $\frac{1}{2}$ E.		N.E. $\frac{1}{2}$ E.		
	5 N.E. $\frac{1}{2}$ E.		N.E. $\frac{1}{2}$ E.		N.E. $\frac{1}{2}$ E.		
	6 N.E. $\frac{1}{2}$ E.		N.E.		N.N.E. $\frac{1}{2}$ E.		
Before High Water, Dover.	7 S.W. $\frac{1}{2}$ S.		S.W. by W. $\frac{1}{2}$ W.		W.S.W.		Stream from the Schelde N.W. by W. to $3^{\circ}$ E. turning sharply to N.E. Stream from the Schelde N.W. by W. to $2^{\circ}30'$ E. turning sharply to N.N.E. $\frac{1}{2}$ E.
	8 S.W.		S.W. $\frac{1}{2}$ W.		S.W. $\frac{1}{2}$ W.		
	9 S.W.		S.W.		S.W. $\frac{1}{2}$ W.		
	10 S.W.		S.W.		S.W. $\frac{1}{2}$ W.		
	11 S.W. $\frac{1}{2}$ S.		S.W.		S.W. $\frac{1}{2}$ W.		

## COMPARTMENT IX.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and the English Coast as far as  $2^{\circ}$  E. longitude.

Hour.	REMARKS.	
After High Water, Dover.	Stream runs northward.	
Before High Water, Dover.	Stream runs southward.	
	Taking the direction of the land, except close to the banks, for which special instructions are necessary.	



## TIDAL STREAMS

COMPARTMENT IX.—*continued.*

Hours.	Shipwash Light Vessel.		Stanford Light Vessel.		St. Nicholas Gat Light Vessel.		Cockle Light Vessel.		Newarp Light Vessel.		Ha
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	
After High Water, Dover.	1 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{3}{4}$ N.		N. $\frac{3}{4}$ E.		N.N.E.		N. $\frac{1}{4}$ W.		N.
	2 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{3}{4}$ N.		N. $\frac{1}{4}$ E.		N.N.E.		N. $\frac{1}{4}$ W.		N.
	3 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{3}{4}$ N.		N. $\frac{1}{4}$ E.		N.N.E.		N. $\frac{1}{4}$ W.		N.
	4 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{2}$ W.		N.N.E.		N. $\frac{1}{4}$ W.		N.
	5 N.E. by E. $\frac{3}{4}$ E.		N.E. $\frac{3}{4}$ E.		N. $\frac{3}{4}$ W.		N.N.E.		N. $\frac{1}{4}$ W.		N.
	6 N.E.		Slack		N. by W.		S. $\frac{1}{4}$ W. on the turn.		N. $\frac{1}{4}$ E.		
Before Low Water, Dover.	5 S.W. $\frac{3}{4}$ W.		S.W. $\frac{3}{4}$ S.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S.
	4 S.W. by W. $\frac{1}{4}$ W.		S.W. $\frac{3}{4}$ S.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S.
	3 S.W. by W. $\frac{1}{4}$ W.		S.W. $\frac{3}{4}$ S.		S. $\frac{1}{2}$ W.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S.
	2 S.W. by W. $\frac{1}{4}$ W.		S.W. by S.		S. $\frac{3}{4}$ W.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		
	1 S.W. by W. $\frac{1}{4}$ W.		S.S.W. $\frac{3}{4}$ W.		S. by W. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		

## COMPARTMENT X.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and longitude  $2^{\circ}$  to  $3^{\circ}$  E.

Hours.	S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	Rate.	N.W. Quarter.	Rate.	REMARKS
After High Water, Dover.	1 N.E. $\frac{1}{2}$ N.		N.E.		N.E. $\frac{3}{4}$ N. *		N. by W.		* Turn sharply the E. and C
	2 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{2}$ N.		N.E. $\frac{3}{4}$ N.		N. $\frac{1}{2}$ E.		
	3 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ E.		N.N.E. $\frac{1}{4}$ E.		N.N.E. $\frac{1}{4}$ E.		
	4 N.E.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ E.		N. $\frac{1}{4}$ W.		
	5 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{2}$ W.		
	6 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. by N.		N.N.E. $\frac{1}{4}$ E.		
Before High Water, Dover.	5 S.W. $\frac{1}{2}$ S.		S.W. $\frac{3}{4}$ W.		S. $\frac{1}{2}$ E.		S. $\frac{1}{4}$ W.		Greatest rate, springs, { flood 2'00 } ebb 3'00 } knots.
	4 S.W.		S.W. $\frac{3}{4}$ S.		South.		S. $\frac{1}{4}$ W.		
	3 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S. by W. $\frac{1}{4}$ W.		S. by W.		
	2 S.W.		S.W. $\frac{1}{2}$ S.		S.S.W. $\frac{1}{4}$ W.		S.S.W.		
	1 S.W. $\frac{1}{2}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S. by W. $\frac{1}{4}$ W.		

## COMPARTMENT XI.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and longitude  $3^{\circ}$  to  $4^{\circ}$  E.

Hours.	S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	Rate.	N.W. Quarter.	Rate.	REMARKS
After High Water, Dover.	1 N.E.		Slack.		N.E. $\frac{1}{2}$ N.		N.E. $\frac{1}{2}$ N.		Stream round south-w.
	2 N.E.		N.E.		N.E.		N.E. $\frac{1}{4}$ N.		
	3 N.E.		N.E.		N.E.		N.E.		
	4 N.E. $\frac{1}{2}$ N.		N.E.		N.E. $\frac{1}{4}$ E.		N.E.		
	5 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		
	6 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		
Before High Water, Dover.	5 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{2}$ S.		S. by E. $\frac{1}{2}$ E.		S.S.E. $\frac{3}{4}$ E.		Greatest rate, springs, { flood 1'70 } ebb 2'00 } knots.
	4 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S.S.W.		South.		
	3 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{2}$ S.		S.W. $\frac{1}{2}$ S.		
	2 S.W. $\frac{1}{2}$ S.		S.W. $\frac{3}{4}$ W.		S.W. $\frac{1}{2}$ S.		S.W. $\frac{1}{2}$ S.		
	1 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{2}$ S.		

# IN THE NORTH SEA.

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## COMPARTMENT XII.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and from longitude  $4^{\circ}$  E. to the Coast of the Netherlands.

Hours.	REMARKS.
<div>After High Water, Dover.</div> <div>Stream runs northward.</div>	<p>The stream takes the direction of the land, except close to the banks, for which special instructions are necessary.</p>
<div>Before High Water, Dover.</div> <div>Stream runs southward.</div>	

## COMPARTMENT XIII.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and from longitude  $1^{\circ}$  to  $3^{\circ}$  E.

Hrs.	S. W. Quarter.	Rate.	S. E. Quarter.	Rate.	N. E. Quarter.	N. W. Quarter.	Leman and Over Light Vessel.		REMARKS.
							Course.	Rate.	
1	N. N. W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 2 25 } ebb 2 25 } knots.	N. by W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 2 00 } ebb 2 30 } knots.	N. N. W. $\frac{1}{4}$ W.	N. $\frac{1}{2}$ W.	N. by W. $\frac{1}{4}$ W.	Greatest rate, springs, 2° knots.	Near the north point of Smith's Knoll the rates are, flood 2°6, ebb 3°0 knots.
2	N. W. $\frac{1}{4}$ N.		N. by W. $\frac{1}{4}$ W.		North.	N. $\frac{1}{4}$ W.	N. by W. $\frac{1}{4}$ W.		
3	N. N. W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		N. by E.	N. by W. $\frac{1}{4}$ W.	N. N. W.		
4	N. N. W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		N. N. E.	N. W. $\frac{1}{4}$ W.	N. N. W.		
5	N. N. W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		E. N. E.	S. by W. $\frac{1}{4}$ W.	N. N. W.		
6	-		N. N. E. $\frac{1}{4}$ E.		S. E.	S. $\frac{1}{4}$ E.	Slack.		
5	S. S. E. $\frac{1}{4}$ E.	Greatest rate, springs, { flood 1 30 } ebb 1 40 } knots.	S. S. E. $\frac{1}{4}$ E.	Greatest rate, springs, { flood 1 35 } ebb 1 50 } knots.	S. E. $\frac{1}{4}$ S.	S. $\frac{1}{4}$ E.	S. S. E.	Greatest rate, springs, 2° knots.	Near the north point of Smith's Knoll the rates are, flood 2°6, ebb 3°0 knots.
4	S. S. E. $\frac{1}{4}$ E.		S. S. E. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ E.	S. by E. $\frac{1}{4}$ E.	S. S. E.		
3	S. S. E. $\frac{1}{4}$ E.		S. by E.		South.	S. S. E. $\frac{1}{4}$ E.	S. S. E.		
2	S. by E.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.	E. S. E. $\frac{1}{4}$ E.	S. S. E.		
1	S. S. E. $\frac{1}{4}$ E.		S. by W.		South.	N. E. by N.	S. S. E.		

## COMPARTMENT XIV.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and  $3^{\circ}$  to  $5^{\circ}$  E. longitude.

Hrs.	S. W. Quarter.	Rate.	S. E. Quarter.	Rate.	N. E. Quarter.	Rate.	N. W. Quarter.	Rate.	REMARKS.
1	W. N. W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 1 30 } ebb 1 40 } knots.	W. S. W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 1 35 } ebb 1 50 } knots.	W. $\frac{1}{4}$ S.	Greatest rate, springs, { flood 0 80 } ebb 1 00 } knots.	S. W. by W.	Greatest rate, springs, { flood 0 90 } ebb 1 00 } knots.	In the north-eastern quarter of this compartment the Heligoland stream joins the Channel stream on the falling water at Dover, and the streams split on the rising water at Dover, and a vessel to the northward of $53^{\circ}30$ on the rising tide will be set down towards Heligoland.
2	N. N. W. $\frac{1}{4}$ W.		W. S. W. $\frac{1}{4}$ W.		West.		N. W. by W. $\frac{1}{4}$ W.		
3	N. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		West.		N. W. $\frac{1}{4}$ N.		
4	N. by E. $\frac{1}{4}$ E.		N. N. W.		N. N. W. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.		
5	N. E. $\frac{1}{4}$ N.		N. E. $\frac{1}{4}$ N.		N. E. $\frac{1}{4}$ N.		N. E. by N.		
6	N. N. E. $\frac{1}{4}$ E.		N. E. by E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		E. by N.		
5	E. $\frac{1}{4}$ S.	Greatest rate, springs, { flood 1 30 } ebb 1 40 } knots.	E. N. E. $\frac{1}{4}$ E.	Greatest rate, springs, { flood 1 35 } ebb 1 50 } knots.	E. by S.	Greatest rate, springs, { flood 0 80 } ebb 1 00 } knots.	S. E. by E.	Greatest rate, springs, { flood 0 90 } ebb 1 00 } knots.	Splitting on Texel Island.
4	S. E. $\frac{1}{4}$ S.		E. N. E. $\frac{1}{4}$ E.		E. S. E. $\frac{1}{4}$ E.		S. E. $\frac{1}{4}$ E.		
3	S. by E.		S. S. W. $\frac{1}{4}$ W.		S. E. $\frac{1}{4}$ E.		South.		
2	S. by W. $\frac{1}{4}$ W.		S. W. by S.		S. E. $\frac{1}{4}$ S.		S. W. $\frac{1}{4}$ S.		
1	S. W. $\frac{1}{4}$ S.		S. W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ E.		S. W. $\frac{1}{4}$ S.		

## TIDAL STREAMS

## COMPARTMENT XV.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and westward of longitude  $1^{\circ}$  E.

Hours.	Course.	Rate.	Spurn Light Vessel.		Dudgeon Light Vessel.	
			Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N. $\frac{1}{4}$ E.	Greatest rate, } flood $2^{\frac{1}{2}}$ knots, } ebb $3^{\frac{1}{2}}$ knots.	E.N.E.	Greatest rate, springs, $3^{\frac{1}{2}}$ knots.	N. by W. $\frac{1}{2}$ W.	Greatest rate, springs, $3^{\frac{1}{2}}$ knots.
	2 N.N.W. $\frac{1}{4}$ W.		S.W. by S.		N.N.W.	
	3 -		S.W. $\frac{1}{2}$ S.		N.W. $\frac{1}{4}$ N.	
	4 S.W.		S.W.		W. $\frac{1}{4}$ S.	
	5 S.W. $\frac{1}{2}$ W.		S.W.		S.W. $\frac{1}{4}$ S.	
	6 S.W. $\frac{1}{4}$ S.		S.W.		S. $\frac{1}{4}$ E.	
Before High Water, Dover.	5 S. $\frac{1}{4}$ E.		S.W.		S. by E. $\frac{1}{4}$ E.	
	4 S. by E. $\frac{1}{4}$ E.		N.E. by E.		S.S.E.	
	3 S.S.W. $\frac{1}{4}$ W.		N.E. by E. $\frac{1}{2}$ E.		S.E.	
	2 N. by E. $\frac{1}{4}$ E.		E.N.E.		E. $\frac{1}{4}$ S.	
	1 N.N.E. $\frac{1}{4}$ E.		E.N.E.		N.E. $\frac{1}{2}$ N.	

## COMPARTMENT XVI.

On the parallel of  $54^{\circ}$  N.

Hours.	$1^{\circ}$ E.		$2^{\circ}$ E.		$3^{\circ}$ E.		$4^{\circ}$ E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N. by W. $\frac{1}{2}$ W.		N.N.W. $\frac{1}{2}$ W.		N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.	
	2 N. by W. $\frac{1}{2}$ W.		N.W. $\frac{1}{4}$ N.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.	
	3 N.W. by N.		N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. by N.	
	4 S. $\frac{1}{2}$ E.		W.N.W. $\frac{1}{2}$ W.		N.W. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ W.	
	5 S. $\frac{1}{4}$ E.		W. $\frac{1}{4}$ S.		N. by W.		N.E. $\frac{1}{4}$ N.	
	6 S.S.E.		S. by E.		E. by N.		E. by N.	
Before High Water, Dover.	5 S.E. $\frac{1}{2}$ S.		S.E. $\frac{1}{4}$ S.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.	
	4 S.E. by E.		S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{2}$ S.	
	3 E. $\frac{1}{4}$ S.		S.E. $\frac{1}{2}$ E.		E.S.E. $\frac{1}{4}$ E.		E. by S.	
	2 N.E. $\frac{1}{4}$ N.		S.E. by E. $\frac{1}{4}$ E.		E.S.E.		S.E.	
	1 N. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{2}$ E.		S. $\frac{1}{4}$ W.		S. by E. $\frac{1}{4}$ E.	

Hours.	$5^{\circ}$ E.		$6^{\circ}$ E.		$7^{\circ}$ E.		$8^{\circ}$ E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.W. by W. $\frac{1}{4}$ W.	Greatest rate, 1 knot.	W. by N.	Greatest rate, 1 knot.	West		E.N.E. $\frac{1}{4}$ E.	Greatest rate, 1 knot.
	2 N.W. by W.		W.N.W.		W.N.W.		N.E. $\frac{1}{2}$ E.	
	3 W.N.W.		W.N.W.		W.N.W.		N.W.	
	4 W.N.W.		W. by N.		W.N.W.		W.N.W.	
	5 W.N.W.		W.N.W.		W.N.W.		N.W. by W.	
	6 W.N.W.		W.N.W.		W.N.W. $\frac{1}{2}$ W.		W. $\frac{1}{2}$ S.	
Before High Water, Dover.	5 E.S.E. $\frac{1}{2}$ E.		S.E. by E. $\frac{1}{2}$ E.		S.S.E. $\frac{1}{2}$ E.		W. by S.	
	4 S.E. by E. $\frac{1}{2}$ E.		S.E. by E. $\frac{1}{2}$ E.		S.E. by E. $\frac{1}{2}$ E.		S.S.W. $\frac{1}{4}$ W.	
	3 S.E. $\frac{1}{2}$ E.		E.S.E. $\frac{1}{2}$ E.		S.E. by E. $\frac{1}{2}$ E.		S. $\frac{1}{4}$ E.	
	2 S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{2}$ E.		S.E. by E.	
	1 S.E. by E. $\frac{1}{2}$ E.		E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{2}$ E.		E.N.E. $\frac{1}{4}$ E.	

About the meridian of  $8^{\circ}$  E. the influence of the Elbe and Weser causes the stream to run nearly two hours to the north-eastward on the falling tide after it has turned westward in other parts, and on the rising tide to run two hours to the westward after the stream has turned eastward in a more westerly meridian.

# IN THE NORTH SEA.

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## COMPARTMENT XVII.

On the parallel of 55° N.

Hours.	0° E.		1° E.		2° E.		3° E.			
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.N.W.	¼	Slack.		N.N.E.		W. ¼ S.		N.W. ½ N.	
	2 S. by W. ¼ W.	½	S.W. ½ W.		W.S.W.		W. ½ N.		N.W. ¼ W.	
	3 S. by E.	1 ½	S.S.W. ½ W.		W.S.W. ¼ W.		W. ½ N.		N.W.	
	4 S. ½ E.	1	S. by W. ¼ W.		S.W. by W.		N.W. by W.		N.W. ¼ W.	
	5 S. ¾ E.	¾	S. by W. ¼ W.		S. ½ E.		S.W. by W. ¼ W.		West.	
	6 S. ¾ E.	¾	S. ¼ W.		S. by E. ¾ E.		S. by E.		S.S.E. ¾ E.	
Before High Water, Dover.	1 S.E. ½ S.	¾	S. ½ E.		E.S.E. ¼ E.		S. ½ E.		S.E. by E. ½ E.	
	2 N.N.E. ¾ E.	½	E.N.E. ¼ E.		E. ½ S.		S.E. by E.		S.E. by E. ¾ E.	
	3 N. ½ W.	1 ½	N. by E. ¼ E.		E. by N.		E. by S.		E. ¾ S.	
	4 N. ¼ W.	1	N.N.E.		E. ¼ N.		E. by S.		E. ¼ N.	
	5 N. ¼ W.	¾	N. by E. ¼ E.		N.E. by E.		N.E. by N.		N. by E. ¾ E.	

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.W.		W. ½ N.		W.N.W. ¼ W.		N. by W. ½ W.	
	2 W.N.W. ¼ W.		W.N.W.		W.N.W. ¼ W.		N. by W. ½ W.	
	3 W.N.W. ½ W.		N.W. by W. ¾ W.		N.W. by W. ¼ W.		N.W. ¾ N.	
	4 N.W. by W. ¾ W.		W.N.W. ½ W.		W.N.W. ¾ W.		N.N.W. ¾ N.	
	5 W. ¾ N.		W.N.W. ¼ W.		W. by N.		N.W.	
	6 Turning.		N.W. by W. ½ W.		W. ½ S.		N.W. by W. ¼ W.	
Before High Water, Dover.	1 E. ¾ S.		S.E. ¾ S.		S.W. ½ W.		W. ¼ S.	
	2 E.S.E. ¼ E.		S.E. by S.		S. ½ E.		S. by W. ¾ W.	
	3 E.S.E. ½ E.		S.S.E. ¾ E.		S.S.E. ¾ E.		S. ¾ W.	
	4 E.S.E. ¾ E.		S.S.E. ¼ E.		S.E. by S.		S. ½ E.	
	5 E. ¾ S.		S.S.E. ¼ E.		S.E. by S.		S. by E. ½ E.	

## COMPARTMENT XVIII.

On the parallel of 56° N.

Hours.	1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.N.E. ¼ E.		Slack.		N.W. ¼ W.		N. ¾ E.	
	2 Slack.		S.W. ½ W.		W.N.W.		N.N.W. ¼ W.	
	3 S. ¾ W.		S.W. ¼ W.		N.W. ¼ N.		N.W. ¼ W.	
	4 S. ¾ E.		W. by S.		N.W.		N.E. ¾ E.	
	5 S. ¾ E.		S. ¾ E.		N. by W. ¾ W.		N.E. by E. ¾ E.	
	6 S. ¾ E.		S. ¾ E.		N. ¼ W.		E. ¾ S.	
Before High Water, Dover.	1 S.E. by E. ¾ E.		E. by S.		N. by E. ¾ E.		E. ¾ N.	
	2 N.E. by E. ¾ E.		E.N.E. ¼ E.		N.E. ¾ E.		E. ¾ N.	
	3 N.E. ¾ N.		E.N.E.		East.		N.E. by E. ¾ E.	
	4 N.E. by N.		N.E. by E. ¾ E.		N.E. by E.		E.N.E. ¾ E.	
	5 N.E. ½ E.		N.E. by E.		North.		N.E. by E. ¾ E.	

COMPARTMENT XVIII.—*continued.*

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 Turning.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	Slack.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	E.N.E. $\frac{1}{4}$ E.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	N.E. $\frac{1}{4}$ E.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.
	2 W. $\frac{1}{4}$ S.		N.N.W.		N.E. by N.		N. $\frac{1}{4}$ E.	
	3 N.W. $\frac{1}{4}$ N.		N.N.W.		N. $\frac{1}{4}$ E.		N. $\frac{1}{4}$ W.	
	4 N. by W. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ W.		N. by W.	
	5 N.N.E. $\frac{1}{4}$ E.		N. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ W.		N. by W.	
	6 N.E. $\frac{1}{4}$ E.		N.N.E.		N. by W.		N. by W.	
Before High Water, Dover.	3 E.N.E. $\frac{1}{4}$ E.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	N.E. by E. $\frac{1}{4}$ E.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	N. by W.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	N.N.W. $\frac{1}{4}$ W.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.
	4 N.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ E.		N. by E.	
	5 E.N.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		E. $\frac{1}{4}$ S.		S. by W.	
	2 East.		E. $\frac{1}{4}$ S.		E. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.	
	1 E. $\frac{1}{4}$ N.		E. by S.		S.E. $\frac{1}{4}$ E.		S.W. $\frac{1}{4}$ W.	

## COMPARTMENT XIX.

On the parallel of 57° N.

Hours.	2° W.		1° W.		0	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S. W. by S.	Greatest rate $1\frac{1}{2}$ knots at half tide.	S. by W. $\frac{3}{4}$ W.	Greatest rate $1\frac{1}{2}$ knots at half tide.	S. by W. $\frac{3}{4}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.
	2 S. W. by S.		S.W. $\frac{1}{4}$ S.		S.S.W.	
	3 S. W. $\frac{1}{4}$ W.		S.W.		S. by W.	
	4 N. $\frac{1}{4}$ W.		W.S.W. $\frac{1}{4}$ W.		S. by W.	
	5 Slack.		Slack.		S. $\frac{1}{4}$ E.	
	6 N.N.E. $\frac{1}{4}$ E.		N. by E. $\frac{1}{4}$ E.		Slack.	
Before High Water, Dover.	5 N.E. $\frac{3}{4}$ N.	Greatest rate $1\frac{1}{2}$ knots at half tide.	N.N.E.	Greatest rate $1\frac{1}{2}$ knots at half tide.	N.N.E. $\frac{3}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.
	4 N.E.		N.N.E.		N. by E.	
	3 N.E. by N.		N.N.E. $\frac{1}{4}$ E.		N. by E. $\frac{3}{4}$ E.	
	2 N.E. by N.		N.E. $\frac{1}{4}$ N.		N.N.E. $\frac{1}{4}$ E.	
	1 South.		E.N.E.		N. by E. $\frac{3}{4}$ E.	

Hours.	1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.S.W. $\frac{3}{4}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.	N. by E. $\frac{3}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.S.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.W. $\frac{1}{4}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.
	2 S.W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ E.		South.		N.W. by W. $\frac{1}{4}$ W.	
	3 S.S.W. $\frac{3}{4}$ W.		S. by E.		S. by W. $\frac{1}{4}$ W.		W.N.W.	
	4 S.W. $\frac{1}{4}$ S.		S.E. by S.		S.W. by W. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.	
	5 Slack.		E. by S.		Slack.		N. by W.	
	6 N.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		Slack.		N. by E.	
Before High Water, Dover.	5 N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	E. $\frac{1}{4}$ N.	Greatest rate $\frac{1}{2}$ knot about half tide.	Turning.	Greatest rate $\frac{1}{2}$ knot about half tide.	N.N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.
	4 N. E. by E.		E. by N.		N.E. by N.		N.E. $\frac{3}{4}$ N.	
	3 E.N.E. $\frac{1}{4}$ E.		East.		N.E. $\frac{1}{4}$ E.		N.E. by E. $\frac{1}{4}$ E.	
	2 E.N.E. $\frac{1}{4}$ E.		East.		E. by N.		E.N.E.	
	1 Slack.		S. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.	

COMPARTMENT XIX.—*continued.*

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N. by E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{3}$ knot about half tide.	S. by E.	Greatest rate $\frac{1}{4}$ knot about half tide.	E.N.E.	Greatest rate $\frac{1}{4}$ knot about half tide.	S.S.E.	Rate 0.9 knot.
	2 N.E. by N.		South.		E.N.E. $\frac{1}{4}$ E.		Slack.	
	3 S.W.		S. by W.		E.N.E.		N.E. by N.	
	4 N.N.W.		N.N.E.		E.N.E.		N.E. $\frac{1}{4}$ N.	
	5 N. $\frac{1}{4}$ W.		North.		E.N.E.		North.	
	6 N. by E. $\frac{1}{4}$ E.		North.		N.N.E.		N. by E.	
Before High Water, Dover.	5 N.E.	Greatest rate $\frac{1}{4}$ knot about half tide.	N. by E.	Greatest rate $\frac{1}{4}$ knot about half tide.	N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{4}$ knot about half tide.	N.E. $\frac{1}{4}$ E.	Rate 0.9 knot.
	4 N.E.		N.N.E. $\frac{1}{4}$ E.		N.E. by N.		N.N.E. $\frac{1}{4}$ E.	
	3 N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ E.		N.E.		N.E. by E. $\frac{1}{4}$ E.	
	2 E. $\frac{1}{4}$ N.		E. by N.		N.E.		N.E. by E. $\frac{1}{4}$ E.	
	1 " East.		E. by N.		N.E.		E.N.E. $\frac{1}{4}$ E.	

## COMPARTMENT XX.

On the parallel of 58° N.

Hours.	3° W.		2° W.		1° W.		°	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 South.	Greatest rate 1 knot about half tide.	S.E.	Greatest rate 0.6 knot about half tide.	S.S.W.	Greatest rate 1 knot about half tide.		
	2 S.E. $\frac{1}{4}$ S.		S.E.		S.S.W.			
	3 East.		S. $\frac{1}{4}$ E.		S.S.W.			
	4 E. by S.		S.E. $\frac{1}{4}$ S.		Slack.			
	5 Slack.		Slack.		N.N.W. $\frac{1}{4}$ W.			
	6 S.W.		N. by W.		N.N.E.			
Before High Water, Dover.	5 W. $\frac{1}{4}$ N.	Greatest rate $\frac{1}{4}$ knot about half tide.	N.W. $\frac{1}{4}$ W.	Greatest rate $\frac{1}{4}$ knot about half tide.	N.N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{4}$ knot about half tide.		
	4 W.N.W. $\frac{1}{4}$ W.		N.W.		N.E.			
	3 N.W. by W. $\frac{1}{4}$ W.		N.W. by N.		N.E. $\frac{1}{4}$ E.			
	2 W. by N.		W. $\frac{1}{4}$ N.		S.S.E. $\frac{1}{4}$ E.			
	1 W. $\frac{1}{4}$ N.		S. $\frac{1}{4}$ E.		S.S.E. $\frac{1}{4}$ E.			

Hours.	1° E.		2° E.		3° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.W.	Greatest rate $\frac{1}{4}$ knot about half tide.	S.W.	Greatest rate $\frac{1}{4}$ knot about half tide.	S. by E.	
	2 West.		W.S.W.		S. $\frac{1}{4}$ E.	
	3 Slack.		W.N.W. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.	
	4 Slack.		N.W. $\frac{1}{4}$ N.		S.S.W.	
	5 N.N.E.		N. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.	
	6 N.N.E.		N. by E.		E. by N.	
Before High Water, Dover.	5 N.N.E.	Greatest rate $\frac{1}{4}$ knot about half tide.	N. by E.	Greatest rate $\frac{1}{4}$ knot about half tide.	E.N.E.	
	4 N.N.E.		N. by E. $\frac{1}{4}$ E.		E.N.E.	
	3 N. by E. $\frac{1}{4}$ E.		N. by E.		E. by N.	
	2 Turning.		N.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.	
	1 W. by N. $\frac{1}{4}$ N.		S.E.		S.E. by E.	

## TIDAL STREAMS.

## COMPARTMENT XXI.

On the parallel of 59° N.

Hours.	2° W.		1°		0	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.W. by S.	Greatest rate 1 knot about half tide.	S.S.W. $\frac{1}{4}$ W.	Greatest rate 0·6 knot about half tide.	W.S.W.	Greatest rate $\frac{1}{4}$ knot about half tide.
	2 S. by W. $\frac{1}{4}$ W.		S.W. by S.		W.S.W. $\frac{1}{4}$ W.	
	3 S. $\frac{1}{4}$ W.		S.W. by S.		N. by E. $\frac{1}{4}$ E.	
	4 S.W. by W. $\frac{1}{2}$ W.		Slack.		N.E.	
	5 W. by N.		Slack.		N.E. $\frac{1}{4}$ E.	
	6 N.W. $\frac{1}{2}$ W.		N. $\frac{1}{4}$ E.		N.E. by E.	
Before High Water, Dover.	5 N.N.W. $\frac{1}{4}$ W.	Greatest rate 1 knot about half tide.	N.N.W.	Greatest rate 0·6 knot about half tide.	N.E. by E.	Greatest rate $\frac{1}{4}$ knot about half tide.
	4 N.W. $\frac{1}{4}$ N.		N.N.W.		E. by N.	
	3 W.N.W.		N.W. by N.		S.E. $\frac{1}{4}$ E.	
	2 S.W. by W. $\frac{1}{4}$ W.		S.W. by W. $\frac{1}{4}$ W.		S.S.W. $\frac{1}{4}$ W.	
	1 S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		W.S.W.	

All the foregoing bearings are magnetic.

**TIME**  
**OF**  
**HIGH WATER ON FULL AND CHANGE DAYS;**  
**WITH THE RISE OF THE TIDE**  
**AT SPRINGS AND NEAPS.**

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*As it is desirable that the following list should be made accurate and complete, it is requested that corrections and additions be forwarded to the Secretary of the Admiralty.*

# TIME

OF

## HIGH WATER ON FULL AND CHANGE DAYS

AT THE PRINCIPAL PLACES ON THE GLOBE ;

ANGED ACCORDING TO THE APPARENT PROGRESS OF THE TIDE WAVE ,

*With the Rise of the Tide at Springs and Neaps.\**

query, thus ?, is placed after the Time of High Water and the Rise, it indicates that what are given are approximations.)

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>England, South Coast.</i>							
	h. m	ft.	ft.		h. m.	ft.	ft.
Ils. (St. Agnes)	4 30	16	12	Chesilton -	6 13	10½	7
Ils. (St. Mary)	4 27	16	12	Portland Breakwater	7 1	6½	4½
Ince -	4 30	16	12½	Poole -	9 10	6½	4¾
d -	5 0	14½	10½	Christchurch -	9 0	5	
rack -	4 35	14½	11½	Needles Point -	11 30		
outh -	4 57	16	12	Hurst, Camber -	9 46	7½	5
Truro	5 5	10	6	Hurst, Camber -	10 0	7½	6
own Quay) -	5 4	15½	12	Yarmouth -	12 0	7	6½
igizey -	5 14	15	11¾	Yarmouth -	10 0		
ry -	5 26	16	13	West Cowes -	12 0		
Looe -	5 37	15½	11½	West Cowes -	10 45	12½	9½
uth Breakwater	5 32	15½	11½	Calshot	11 45		
Sutton	5 43	15½	11½	(Castle Point)	11 30	13	9½
ol	5 45	15	11	Southampton -	10 30	13	9½
port Dk. Yard	5 47	14¾	10¾	Southampton -	12 45	12½	10
sh, R. Tamar	5 55	13½	9¾	Portsmouth Dk. Yard	11 41	12½	10
reen "	6 6	12½	8¾	Port-			
llie "	6 12	10½	6½	chester (off the	11 46	13½	10¼
ock "	6 17	5½	1¼	Castle)			
wellham "	5 47	14½	10½	Ports-			
Head "	5 47	8½	4½	bridge (a ¼ mile	11 48	6½†	4†
igh Quay, }	5 37	16½	11½	W. of bridge)			
R. Tavy }	5 40	16¼	11¾	Fare-			
rtow	5 47	16¼	11¾	ham (in Chan-	11 48	11¼	8½
ry B., R. Yealm	5 45	15½	11½	nel close to the			
— R. Erme	5 41	15	11½	Upper Quay)			
— R. Avon	6 16	14	10	Bridge	11 51	7½	4¾
Head -	6 0	13	9½	Bembridge Point -	11 0	14	10½
nbe -	6 0	13½	10	Chichester	11 30		
outh -	6 21	12½	8½	Pagham (entrance)	11 30	16½	12½
mouth -	6 21	11½	7¾	Selsea Bill -	11 45	16½	12½
y -	6 5	11¼	7¾	Littlehampton -	11 36	16	11½
uth -				Arundel (Bar) -	11 35		
Regis -							
rt -							

the Rise of the tide is meant its vertical rise above the mean low water level of spring-tides. See Diagram, page vi.

† Above the bed of the lake.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
(Town) -	12 25			Cardigan -	7 1	12	
1 -	11 34	18	13½	New Quay -	7 30	15	
-	11 15	19½	16	Aberystwyth -	7 31	13½	
n -	11 51	20	15	Aberdovey -	8 0	15	
lead -	11 20	20	15	Sarn-y-bwch Reef -	7 40	14	
-	10 53	24	17½	Barmouth -	7 41	17	
-	11 20	22	17½	Sarn Badrig -	7 30	13	
as -	10 45	21½	19	Port Madoc -	7 30	17	
-	11 7	20	16½	St. Tudwall Road -	7 45	14	
-	11 12	18½	15	Pwllheli -	7 46	13½	
-	11 15	16	12½	Bardsey Id. -	7 40	15	
-	11 44	15	12	Porth-dyn-lleyn -	8 30	16	
<i>England and Wales, West Coast.</i>				Caernarvon -	9 33	13½	
es -	4 30	16	12	Holyhead -	10 11	16	
nes) -				Amlwch -	10 30	18½	
es -	4 27	16	12	Beaumaris -	10 32	21½	
ary) -				Chester -	10 30	26	
nwall -	4 35	18½	13½	Liverpool -	11 23	26	
-	4 44	21	15	Formby Point -	10 35	28	
-	5 13	20½	16½	Ribble Lighthouse -	10 51	24	
-	5 15	25	17½	Preston -	11 49	10	
n -	5 45	23	17	Fleetwood (Wyre Lt) -	11 11	27	
land -	5 15	27	20	" (Port) -	11 12	26½	
e (Bar) -	5 30	19	14	Lancaster -	11 16	8½	
e (Bridge) -	6 28	10½	7½	Poulton-le-Sands -	11 26	27½	
e -	5 58	23	16½	Piel Harbour (Pier) -	11 5	28	
-	6 7	16	12	Whitehaven -	11 14	23½	
e -	5 42	27½	21½	Port Harrington -	11 5	26	
-	6 30	35	26½	Workington -	11 4	20	
ter Bar -	6 50	35	26½	Maryport -	11 3	18	
uper-mare -	6 54	37	28½	Abbey Head -	11 10	23	
Islands -	6 54	37½	28½	Southernness -	11 20	28	
d -	7 16	41½	31	Annan Foot -	11 56	20	
ing Road) -	6 56	44	33	Port Carlisle -	12 10	20	
-	7 30	38	28½	Point of Ayr -	11 7	20½	
-	7 10	24	18	Douglas, I. of Man -	11 12	20½	
-	6 59	38	29	Ramsey -	11 12	19½	
nt -	6 25	33	25	Peel -	11 8	16½	
(Mum-} -				Calf Sound -	11 17	16½	
hthouse) -	6 1	27½	20½	Port St. Mary -	11 10	20	
wl -	6 8	28½	21½	Castletown -	11 10	20	
(Bar) -	6 16	28	21	<i>Scotland, West Coast.</i>			
hen (Bar) -	6 10	26	19½	Kirkcudbright -	11 10	23	
and -	6 0	24½	16½	Solway (Tarn Point) -	11 22	23	
-	6 0	27	20	Troon -	11 50	10	
St. Ann } -				Mull of Galloway -	11 15	15½	
ouse) -	5 56	24	18	Port Patrick -	11 10	15	
e Dk. Yard -	6 12	21	15½	Loch Ryan -	11 12	11	
Castle, } -				Mull of Cantyre -	10 35	4	
ddau R. } -	6 23	20	14½	Campbellton -	11 45	8½	
ping " } -	6 27	20	14½	Lamlash -	11 49	10	
Milford } -	6 31	19	13½	Ayr -	11 50	8½	
dwest " } -	6 42	7½	2½	Ardrossan -	11 45	10	
Light-} -	6 0	21		Millport, Great } -			
ound " -	6 0	17		Cumbræ -	11 50	10	
i -	6 56	11½	8½	Largs -	11 50	10	
-	7 0	12	9	Inverary -	12 0	10	
				Greenock -	0 8	9½	
				Port Glasgow -	0 18	9	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
rtion -	0 20	9		Vallay, North Uist	6 10	11½	8½
(Canal)	0 39	9		Barra, North Harb.	5 48	11½	
nce) -	1 15	9		Loch Maddy, } North Uist	6 6	12½	9½
-	1 25	9	7½	Loch Eport -	6 6	12½	9½
ng -	12 6	12		Berneray, I. of Harris	6 11	13	9½
oil -	12 6	10	6	West Loch Tarbert -	6 4	11¾	8½
rivan -	11 55	6		East Loch Tarbert	6 10	13½	10
les, Kyles }	11 50	10	8	Obb of Harris -	6 16	11½	8½
e -				Loch Seaforth			
Head -	11 49	10		(Athline) -	6 16	15	10
ss -	11 50	9	6	Loch Roag (Ber-			
ig, Loch }	11 53	9	7½	nera) Lewis I. -	6 11	11	8
				Loch Erisort, }			
ound -	2 22	4	2½	Lewis Id. -	6 43	15¼	11½
en, Islay -	5 0	5	4	Loch Clay -	6 9	14¾	9½
caig -	4 58	6½	4	Stornoway -	6 46	13½	9½
olin Ferry	4 41	6½	4½	St. Kilda -	5 30		
Side -	4 56	3½	2½	Rockall -	3 30	12	
-	4 49	6-8	4-5	Cape Wrath -	7 30	15½	
land -	5 2	11½	7	Loch Tongue -	7 53	15	12
Sound -	5 10	10-12		Loch Eriboll -	7 43	14¾	11
-	5 22	12	9½	Thurso -	8 28	14¾	11
-				Stroma, S. side -	9 47	9	6½
pin -	5 26	12½	8½	Swona, E. side -	10 24	10	7½
-	5 15	13	9	" W. side -	9 35	10	7
of Mull -	5 0	12	10	Great Skerry, }			
ine -	5 33	13¾	10½	E. side -	11 4	9½	6
ry -	5 36	13	9½	" W. side -	10 53		
lea -	6 0	15	11				
adth (Go- }	5 29	11¾	8	<i>Orkneys.</i>			
I. of Mull }				Stromness -	9 0	10	7½
and -	5 11	11¾	8¾	Westness -	9 11	10	7½
n -	5 24	12	8½	Kirkwall -	10 9	10	7½
-	5 28	10	7½	Deer Sound -	10 30	10	7½
udart -	5 44	13½	9½	Widewall -	9 3	10	7½
ourn -	5 45	13½	10½	Otterswick -	9 13	11	8
-	5 50	13½	10				
Carron }				<i>Shetland Isles.</i>			
skton) -	6 29	16½	11½	Balta -	9 45	6	4½
huich -	6 0	15½	11	Lerwick -	10 30	6	4
'orridon -	6 20	15	11	Hillswick, or Urie }			
ona, Lt. Hse.	6 20	14½	10½	Firth -	9 45	6½	5
levis -	5 47	14½	10	Sealloway -	9 30	5½	4½
Dunvegan }				Sumburgh Head -	9 45		
vegan -				Fair Isle -	11 0	5	3½
le, I. of }	6 7	15½	11				
e) -				<i>Scotland, East Coast.</i>			
r, I. of Skye	5 50	14¾	10½	Duncansby Ness -	10 14	10	7
-	6 32	15	10½	Wick -	11 22	10	7½
axford -	6 44	15	11½	Dornock Road -	11 47	11	
inver -	6 41	14	11	Cromarty -	11 56	14	11
Alsh (Kyle }	6 16	15½	11	Inverness (Kelloch }			
) -				Pier) -	12 18	12	9½
Summer I.	6 37	14	10½	Banff -	0 28	10½	8
Broom }	6 40	14½	10½	Fraserburgh -	0 40	11	8½
pool) -							
we (Poolewe)	6 39	14½	10½				
Islands }							
lay) -	5 44	12½	8½				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neap
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
Peterhead -	0 34	10½	8½	Wisbeach Eye -		20	
Aberdeen -	1 0	12	10	Sutton Bridge -		18	
Stonehaven -	1 10	14	11	Wisbeach -	7 30	15	
Montrose -	1 25	13	10	Wells Bar -	6 20	18	
Arbroath -	1 35	14	11	Wells -	7 0	12	
Tay River (Bar) -	2 6	16	14	Blakeney Bar -	6 30	15	
Broughty Ferry -	2 22	14½	11	Blakeney -		9	
Dundee -	2 32	14½	11½	Cley -		5½	
Perth -	3 35			Cromer -	7 0	14½	11
Cockenzie, Firth of } Forth -	2 16	15½	13	Leman Shoal -	6 0		
Leith -	2 17	16½	12½	Ower Shoal -	6 30		
Granton Pier -	2 20	16	12½	Hammond Knoll -	7 40		
Burntisland -	2 24	16½	12½	Winterton Ridge -	7 50		
Queensferry -	2 37	18	14	Yarmouth Road -	9 15	6	4
Kincardine -	2 53	17½	15	" Haven, Brush		5½	4½
Alloa -	3 18	17½	15	" Bridge		5	4
Stirling -	3 52	7½	4½	Lowestoft -	9 57	6½	5½
Dunbar -	2 8	14½	11	Blyth River, South } wold -	10 20	6½	4½
Eyemouth -	2 15	15½	11½	Aldborough -	10 45	8½	6½
Berwick -	2 18	15	11½	Kentish Knock -	11 47		
<i>England, East Coast.</i>				Orfordness -	11 15	8	6½
Holy Island Harb. -	2 30	15	11½	Hollesley -	11 30	8½	6½
North Sunderland -	2 30	15	11½	Orford Haven Bar -	11 30	7½	
Coquet Road -	3 0	14½	11	Orford Quay -	12 36	7½	
Blyth -	3 15	15	11	" Sloughden -	1 0	7½	
Tyne River (Bar) -	3 20	14½	11	" Snape Bridge -	3 0	6	
" North Shields } (Low Lt. Hse.) -	3 23	13½	10	Woodbridge Haven } Bar -	11 45	12	9
" Howden -		12		" Kingston Quay -	12 35	10	
" Walker -		10½		" Wilford Bridge -	12 55	7	
" Newcastle -	4 23	10½		Harwich Harbour -	12 6	11½	9
Sunderland -	3 22	14½	11	The Naze -	12 6	12½	10
Seaham -	3 24	14½	10½	Orwell River, Pin- } mill -	12 20	12	
Hartlepool -	3 28	15	11½	" Downham } Reach -	12 27	12	
Tees River, Bar -	3 45	15		" River, } Ipswich -	12 35	13½	
" Middlesborough -	3 55	13		Stour River, } Wrabness -	12 29	12	
" Stockton -	4 40	11		" Mistley Quay -	12 48	11½	
Whitby -	3 45	15	11½	" Cattawade } Bridge -	1 8	4½	
Scarborough -	4 11	15½	12½	Colne River, Colne } Point -	12 0	14	10
Filey Bay -	4 20	16	12½	" Wivenhoe -	12 10	15	10
Flamborough Head -	4 30	16	12	Blackwater River, } Scales Point -	12 0	14½	10
Bridlington -	4 39	16	12	" Heybridge -	12 20	12	8
Humber River, } Spurn Point -	5 26	18½	15	Chelmer River, } Maldon -	12 32	10	6
" Grimsby -	5 36	19½	15	Gunfleet Sand, N.E. } end -	11 40	12	8
" Killingholme -	6 2	19½	15½	Crouch River, } Foulness -	12 5	14½	10
" Hull -	6 29	20½	16½	" Hull Bridge -	12 25	16	11
Humber Ouse } River, Goole -	7 44	14		Maplin Light -	12 5	14½	10
Boston Deep, Clay } Hole -		21½		Margate -	11 40	15½	13
" Hob Hole -		17		Pansand Hole -	12 0	15½	13
" (Sluice) -	7 0	12					
Lynn Deep, Long } Sand -	6 0	23					
" Lynn Road -		20					
" Lynn -		18					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Clear -	12 30	15½	13	<i>Ireland, West Coast.</i>			
Mass -	0 37	16	13½	Cape Clear -	4 0	9	6½
um -	1 2	17½	14	Skull -	4 2	9½	7½
send -	1 10	17½	14	Crookhaven -	4 9	9½	8
rich -	1 37	18½	15½	Dunmanus Harbour	3 57	9½	7½
wich -	1 43	19	15	Dunbeacon -	3 51	10½	7½
n Docks -	1 57	19½	17	Black Ball Harbour	3 40	9½	7½
a Bridge -	2 7	19½	16½	Castletown, Bear-			
<i>Ireland, South and East Coasts.</i>				haven -	4 14	9½	7½
Clear -	4 0	9	6½	Bantry Harbour -	3 47	10	7½
ore -	4 23	10½	8½	Bray Head -	10 45	12	9½
townsend -	4 21	10½	8	Kenmare R., Bal-			
kilty Bay -	4 30	11	8½	lycrovane -	3 42	10½	7½
macsherry -	4 36	10½	8½	„ Dunkerron	3 45	10½	8
le -	4 43	11½	9	„ Ormond -	3 43	10	7½
stown -	5 1	11½	9	„ West Cove	3 52	10	7½
(Penrose) -	4 58	12½	10	Ballinskellig Bay -	3 40	12	7½
ottin -	4 54	12	9½	Valentia Harbour -	3 42	11	8
al -	5 14	12½	10	Ventry -	3 44	10½	7½
ecourty, -				Blasket Islands -	3 30	11½	8
garvan -	5 12	12½	9½	Dingle -	3 51	10½	7½
ore -	5 27	12½	9½	Smerwick -	3 50	11½	8
ford (Dun-				Tralee Bay (Fenit)	4 3	12½	9½
non Fort) -	5 20	12½	10	R. Shannon, Kil-			
(Bridge) -	6 6	13½	10½	baha -	4 16	13	9½
oss -	6 4	12½	10	„ Kilrush -	4 42	14	10½
s -	5 40			„ Carriga- -	4 44	14	10½
rd -	7 21	5	3½	holt -			
chael Point -	8 30	4½	3	„ Tarbert -	4 57	14½	10½
w -	8 45	4	3	„ Foynes Id.	5 35	15½	12
low -	10 29	0	6½	„ Mellon -	6 1	18½	13½
y Island -	10 45	13	11	„ Limerick	6 16	18½	13½
town -	11 10	11	8½	Liscannor Bay -	4 23	13½	10
Bar (Pool-				Mutton Island -	4 20	13½	9½
Lt. House) -	11 12	12-14	9-11	Galway -	4 35	14½	11
h Harbour -	11 9	13	10	Killeany, Arran Ids.	4 28	13½	10
ide Inlet -	11 15	10	8	Cashla Bay -	4 33	16	12
stown Inlet -	11 15	10½	8	Kilkieran Cove -	4 34	15½	11
ies Islands -	11 0	13	10	Greatman Bay -	4 39	15½	11½
iggan -	10 40	11		Roundstone -	4 28	13½	10½
heda (Bar) -	11 0	11½	9	Slyne Head -	4 30	13½	10
alk -	10 56	13½	11½	Clifden Bay -	4 30	13½	10
castle Point	11 2	14	11½	Ballynakill Bay -	4 40	12½	9½
ngford (Bar) or	11 0	14	11	Inishbofin -	4 34	12½	9½
nfield Point.				Inishturk -	4 36	12½	9½
Varrenpoint -	11 10	14½	12	Clare Island -	4 38	12½	9½
astle -	10 30	16	12	Westport -	4 57	12½	9½
ass -	11 0	16	12	Achillbeg -	5 14	10½	8
Rock -	10 58	13	10½	Bulls Mouth, -			
Strangford -				(N. entrance of	5 38	10½	7½
llard Point) -	10 53	14	11½	Achill Sound) -			
Strangford -	12 31	10½	8½	Blacksod Bay -			
Quay -				(Quay) -	4 47	10	8½
Quoile Quay	12 45	11	9½	Broadhaven Harb.	5 0	10½	7½
Kircubbin	12 42	11½	9½	Killala Bay -	5 22	10½	8
Killyleagh	12 40	11	9½	Sligo Bay -	5 18	11½	8½
of the Lough				Ballysadare (Quay)	6 0	8½	5½
ry Rocks) -	12 44	11½	9½	Sligo Harbour -	5 23	11½	8½
				(Oyster Island) -			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	<i>h. m.</i>	<i>t.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	
Ballyshannon (Bar)	5 18	11½	8½	Granville	6 13	37	2
Donegal Harbour	5 18	11½	8½	Régneville	6 20	35	2
(Salthill Quay)	5 18	11½	8½	St. Germain	6 20	34	2
Teelin Harbour	5 16	11½	8½	Carteret	6 25	31	2
Killybegs	5 16	11½	8½	Eceehous	6 32	31	2
Lough Rossmore	5 20	11	8	Jersey, Rosel	6 15	30	2
Rutland Island	5 22	11	8	" St. Helier	6 25	30½	2
Gweedore (Bunbeg)	5 32	11	8	Diélette	6 40	27	2
<i>Ireland, North and East Coasts.</i>				Goury	7 6	22	1
Ballyness (Bar)	5 22	11½	8½	Omonville	7 29	15½	1
Sheephaven	5 32	11½	8½	Guernsey (St. Peter Port)	6 37	26	1
Mulroy Bay, (Bar)	5 40	11½	8½	Casquets	6 45	15½	1
" Fanny Hole	6 17	9½	8	Alderney	6 46	17½	1
" Seamount Bay	6 44	7½	8	Cherbourg	7 49	17	1
" Cranford Bay	8 3	4	2½	Barfleur	8 51	17	1
Rathmullan, Lough	5 42	12½	9	La Hougue	8 42	18½	1
Swilly	5 42	12½	9	St. Marcouf Is.	9 55	20	1
Trawbrega Lough	6 10	11½	8½	Port-en-Bessin	8 57	20	1
Slievebane Bay	5 49	10½	7½	Courceulles	9 7	20	1
Culdaff Bay	5 53	8½	6	Oystreham	9 38	21	1
Warrenpoint,	6 20	6½	5	Merville	9 36	21	1
Lough Foyle	6 20	6½	5	Dives	9 39	21	1
Moville	7 6	7½	5½	Honfleur	9 29	23½	1
Londonderry	8 1	7½	5½	Quillebœuf	10 6	9½	1
Coleraine	6 24	6½	4	Caen	10 57		1
Port Rush	6 8	5½	3½	Hâvre	9 51	22	1
Skerries	6 15	5	3	Rouen	2 28		1
Ballycastle Bay	6 25	3	2	Fécamp	10 44	23½	1
Red Bay (Pier)	10 31	4	4	St. Valery-en-Caux	10 46	27	2
Cairnough	10 51	5½	5	Dieppe	11 6	27	2
Maiden Rocks	10 43	6½	6½	Tréport	11 9	27	2
Lough Larne	10 48	6½	6½	Cayeux	11 5	27½	2
Belfast	10 43	9½	8	Hourel	11 26	27½	2
Donaghadee	11 13	11½	9½	St. Valery-sur-Somme.	11 46	27	2
South Rock	10 58	13	10½	Boulogne	11 25	25	1
Lough Strangford	10 53	14	11½	Cape Grisnez	11 27	21½	1
(Killard Point)	10 53	14	11½	Calais	11 49	19½	1
<i>France, North Coast.</i>				Gravelines	12 0	19	1
Ushant	3 32	19½	13½	Dunkerque	12 8	16½	1
Abervrach	4 14	22	16	<i>North Sea, East Coast.</i>			
Ile de Bas	4 49	23	17	Nieuport	12 18	16	1
Roscoff	4 46	23	17½	Ostend	12 25	19	1
Morlaix Road	4 53	24	18	Blankenberg	12 48	13	1
Ploumanach	5 15	24½	18½	Bathz	3 15	15	
Ploughrescan	5 17	25½	18½	Flushing	1 20	15	
Tréguier	5 32	25	18½	Antwerp	4 25	15	
Héaux Lights	5 45	31	23½	Veere	1 20	15	
Bréhat	5 51	31	23½	De Roompot	12 30	12	
Paimpol	6 0	31	23½	Zieriksee	2 0	11	
Portrieux	6 0	31	23½	Brouwershaven	2 15	10	
Binnic	6 3	30	22½	Goeree (West Gat)	1 45	7	
Dahouet	6 5	32	23½	Hellevoetsluis	2 30	8	
Erqui	5 59	33½	24½	Brielle	3 0	5	
St. Malo	6 5	35	26	Rotterdam	3 45	7	
Les Minquiers	6 6	35	26	Katwyk	2 30	5	
Cancale	6 20	37	27	Texel (outside shoals)	6 30	4	
Iles de Chansey	6 9	35	26	Kykduin	7 0	12	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.				
ediep -	7 27	4	3½	<i>Iceland.</i>			
elling(West) -	8 40	6	5		h. m.	ft.	ft.
nd Gat -	9 0	7		Reikiavik -	5 0	17½	13½
Hollum Rd. -	11 30	7		<i>Lapland.</i>			
outer buoy) -	10 0	8-10		Liza Bay -	5 58	9	
m (road) -	10 30	8-10		Nova Zembla Harb. -	6 36	10	
yl -	11 15	8-10		Jekatarina Islands -	6 23	10	
a -	12 0			Kildin Island -	6 45	12	
rney -	10 30	8		Habitable Island, } -	7 9	9	
outer light } -	11 30			Seleney Bay - }			
el -				Teriberka River -	7 20	12	
ger Oog -	12 0	9?		Olenji Islands -	7 30	12	
land -	11 33	9½	7	Charlowka River -	8 8	12	
entrance -	12 0	11		Seven Islands -	8 20	12	
Cuxhaven -	1 8	10		Jukan Islands -	9 0	13	
Brunsbüttel -	1 56	9		Sviatoi Nos -	9 15	14	
Gluckstadt -	3 9	10		<i>White Sea.</i>			
Altona -	5 19	7		Turna Bay -	9 54	11	
Hamburg -	5 29	6½		Trek Island -	10 48	20	
Tonning -	2 1	9		Litke Ridge -	11 45	15	
Friedrich- } -	2 37	9		Cape Kanushin -	11 54	15	
stadt -				Sosnovets -	11 44	18	
Rendsborg -	7 42	4		Morjovets I. -	11 20	17	
a -	2 36	9		Cape Voronov -	11 20	17	
-	2 21	6		Intsi Point -	11 55	16	
ng -	2 45	5		Kouloi River -	1 15	20	
nde Gab -	2 41	2		Mezen -	1 48	15-22	
minde -	3 34	2		Kerets Point, Gulf } -	4 30	5½	
and or Horn } -	1 44	5		of Arkhangel - }			
nt -				Nikolskoi Tower -	6 0	2	
minde -	4 9	2		Moudinga I. -	5 50	3½	
als -	4 28	1		Dvina Bar -		3½	
a or the Skaw -	5 56	1		Arkhangel -	7 28	2½	
a -	1 30	4		Nikolskoi Chan. -	5 25	3	
als Islands -	10 45	6		Gribanika Pt. -	4 50	3	
o Fiord -	10 45	7		Jijginsk I. -	5 15	4	
uscia -	12 0	8		Cape Orlov Letni, } -	5 18	4	
lands -	11 45	7		Gulf of Onega - }			
-	12 0	9	7½	Onega River -	9 17	6-7	
m Islands -	12 0	9	7½	Souma -	6 30	5½	
so -	1 45	8		Solovet Road -	5 0	4	
erfest -	1 10	9		Kyem River -	5 23	4	
<i>Faroe Islands.</i>				Kalgalakaka -	6 50	7	
e Fiord -	11 15	6½	4½	Keret, Gulf of } -	3 8	6	
e Fiord -	12 0	6½	4½	Kandalak - }			
ig Fiord -	0 30	6½	4½	Kandalaksha -	3 25	7	
ness -	3 12	6½	4½	Sosnovaia Bay -	2 40	6	
se Fiord -	4 0	6½	4½	Kou Zomen -	3 30	6	
en Fiord (be- } -	5 0	9½	7½	Tetrina -	3 17	7	
en Stormoe } -				<i>Nova Zembla.</i>			
Sandoe) -				Hakluyt Head -	1 30	4	
" (be- } -	5 30	9½	7½	<i>Spitzbergen.</i>			
en Hestoe } -				Bell Sound -	8 56	3½	
Sandoe) -							
se Fiord -	6 0	9½	7½				
sanahaven -	8 0	9½	7½				
se Fiord -	6 0	9½	7½				
ness Fiord -	9 0	9½	7½				
Fiord -	11 0	9½	7½				



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Africa, West Coast.							
(From Cape of Good Hope to the Northward.)							
	h. m.	ft.	ft.		h. m.	ft.	ft.
Simons Bay -	2 44	5½	3½	Monrovia -	6 0	6	
Hout Bay -	2 20	5		Gallinas River -	6 45	4	
Table Bay -	2 40	5		Gilmorris Id. -	6 0	11	
Saldanha Bay -	2 0	6		Sherbro River- }			
St. Helena Bay -	2 30			Edmonstone Id. "		8	
Roodewall Bay -	2 30	6½		Bagroo River "		11	
Hondenklip Bay -	2 30	5½		Banana Islands -	8 15	9	
Mc. Dougall Harb. -	2 30	5½		Sierra Leone -	7 55	8	
Port Nolloth -	2 30	5½		Yellaboi Island -	7 10	10	
Elizabeth Bay -		5 - 6		Scarcies Rivers -	7 10	10	
Angra Pequena -	2 30	8		Mellacoree R. -	7 40	11	
Ichabo Island -	1 0	6	4	Forecarreah R. -	7 40	11	
Spencer Bay -	10 50	5 - 6		Mahneah R. -	7 40	11	
Port d' Ilheo -	3 0	8 - 10		Isles de Los -	6 35	13	
Walvisch Bay -	1 54	6		River Ponga -	7 30	12	
Port Alexander -	3 0	5		" Nunez -	10 0	15	
Great Fish Bay -	2 30			" Compoonee -	10 0	15	
Little Fish Bay -	2 30	5-6?		Bijouga Ids., Or- }	10 0	11	
Lobito Bay -	2 20	5		ango Channel - }			
Benguela -	2 30	5?		" Arcas - }	10 10	11 - 14	
St. Helena Island -	3 11	3		Channel -			
Ascension Island -	5 30	2		" Bissao -	11 0	8	
San Paul de Loanda -	4 30	5		River Cacheo -	7 45	8	
River Congo -	4 30	6		" Gambia -	8 10	6 - 9	
Mayumba -		7		Joombas River -	8 10	6	
River Gaboon -	5 30	3		Salm River -	8 10	6	
Cape Lopez -	4 30	4-6?		Cape Verde -	7 45	5	
Corisco Bay -	5 0	7		Senegal -	10 30		
(Elobey Isles) - }				Sal, C. Verde Ids. -	7 45	5	
Anno Bom Id. -	3 45	5		Porto Praya " -	6 0?	5	
St. Thomas Id. -	3 25	4½		Portendik -	10 0	6	
Princes Id. -	3 45	4½		Levrier Bay -	12 0	6 - 7	
Fernando Po -	4 0	7		Ouro River -	12 0	8 - 9	
Cameroon River -	4 0?	6		Cape Blanco -	11 46	6	
Bonny and New }				Cape Bojador -	12 0	8?	
Calabar Rivers- }	5 0	9		Cape Juby -		8	
Brass River -	4 0	6		Ferro, Canary Ids. -	12 30?	9?	
River Niger, Nun }				Palma " -	12 30?	9?	
(entrance) - }	4 8	6		Gomera " -	12 45?	9?	
" Benin -	4 30	7		Lanzarote " -	1 0?	9?	
" Middleton -	4 15	5		Santa Cruz, Tenerife -	1 30	8	
" Pennington -	4 15	5		Puerto de la Luz, }			
" Dodo -	4 17	5		Gran Canaria - }	12 52	10	
" Ramos -	4 20	5		Santa Cruz or - }			
" Forçados -	4 22	5		Agadir -	12 45	9	
" Lagos -	6 0	2		Mogador -	1 18	10-12	
Cape Coast Castle -	4 30	6		Cape Cantin -	10 0	10	
St. George d'Elmina -	4 30	6		Rabat -	1 46	9 - 12	
Cape Three Points -	4 0	4		El Araish -	1 30	9 - 12	
Axim -	4 30	4		Tangier -	1 42	8	
Grand Lahou -	4 20	4		Ceuta -	2 6	3½	
Tabou River -	4 45	3 - 4		Tetuan -	2 23	2½	
Cape Palmas -	4 30	4		Tunis (Goletta) -		3	
Sinou -	5 0	4		Jerba -	3 10	7	
Sangwin River -	5 15	4					
Grand Cestos -	5 20	4		Europe, West Coast.			
Edina -	5 50	4		Malaga -	12 0	3	
Junk River -	5 45	5		Gibraltar, old Mole -	2 20	3½	
				Algeciras -	1 49	4	
				Tarifa -	1 46	6	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ina Rocks -	1 45	9½		Concarneau -	3 12	13	9½
ia -	1 24	12½	8	Penmark Rocks -	3 16		
car -	1 27	12½	8	Glenan Is. -	3 12	13	10
ia -	1 34	12½	8	Ile de Sein -	3 21	17½	12
car -	1 53	12½	8	Brest -	3 47	19	13½
ia -	2 0	12½	8	Conquet Road -	3 46	21	15
-	1 18	11½	7½	Ushant -	3 32	19½	13½
-	2 7	13					
(Belem) -	2 30	8		<i>South America, East Coast.</i>			
e -	2 30	12	9	<i>(Cape Horn to the Northward.)</i>			
go (Bar) -	2 30	7		St. Martin Cove, } -	3 50	8	
Azores -	2 30	10		Cape Horn Ids. -			
ra -	11 45	4		Cape Peñas -	6 42	12	
hael -	12 32	4½		Cape San Diego -	4 30	10	
al Bay, Ma- } -	12 30	6		Orange Bay -	3 30	6	
-	12 48	7		Goree Road -	4 0	8	
-	3 0	12-13		Le Maire Strait -	4 0	7	
inisterre -	3 0			Staten Island -	4 30	8	
amariñas -	3 0	15		San Sebastian Bay -	7 0		
ia -	3 0	15					
-	3 0	15		<i>Falkland Islands, East Falkland.</i>			
-	3 0	15		Berkeley Sound -	5 0	7	
-	3 0	15		Port William -	5 15	7	5½
-	3 0	15		Port FitzRoy -	4 45	6	
-	3 0	15		Port Pleasant -	5 0	6½	
ro -	3 0	15		Island Harbour, } -	5 20	6	
rance) -	3 0	15		Choiseul Sound -			
Bay -	3 15	15		Mare Harbour -	6 0	6	
artin de la } -	3 30	15		Darwin Harbour -	6 30	5½	
na -	3 30	15		Walker Creek -	6 20	5½	
der -	3 30	15	12	Low Bay -	5 0	5½	
a -	3 30	12½	10½	Adventure Sound -	5 30	5½	
(Bar) -	3 0	13		Bay of Harbours -	6 0	5	
ga -	3 15	12		Falkland SoundN } -	6 45		
(Town) -	3 20	9		entrance } -	7 0		
astian -	3 0	12	9	" S. entrance -	7 30	5	
asages -	3 0	12	9	Ruggles Bay -	7 30	5	
-	3 19	12½	8	Port King -	7 30	5	
ne (Bar) -	3 45	12	10½	" Sussex -	8 15	6	
ut, Adour R. -	3 39	8½	6	" San Salvador -	8 10	8	
non -	4 37	11½	9½	" San Carlos -	7 0	8	
ian Lt. house -	3 37	13½	10½				
-	3 38	13½	10				
rin -	4 11	14½	11	<i>West Falkland.</i>			
ux -	6 50	14	12½	Port Stephens -	7 45	7½	
ix, Charente } -	3 20	17	12½	" Albemarle -	7 15	7	
Entrance -				" Edgar -	7 15	6	
leron -	3 50	19		Fox Bay -	7 0	6	
fort -	4 6	17	13	Manybranch Harb. -	7 40	7½	
lle -	3 31	17	13	Port Egmont -	7 30	11	
bles d'Olonne -	3 26	14	10	Hope Harbour -	8 10	7	
e River (en- } -	3 31	15	11½	Shallow Harbour -	9 30	6	
ce, -				ShipHarbour, New } -	10 30		
eu -	3 6	14½	10	Island -			
Noirmontier -	3 2	16	11½				
Navallo -	3 42	13	9½	<i>South America, East Coast—continued.</i>			
zaire -	3 10	15½	11	Coy Inlet -	9 30	40	
le Palais, } -	3 18	14½	10½	Port Gallegos -	8 50	46	
e Ile -				Santa Cruz River -	9 30	40	29
ouis, L'Orient -	3 11	13	9½				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neap.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Port San Julian -	10 45	30		English Harbour, }			
" Desire -	12 10	18½		Antigua - - }		2	
" Melo -	3 40	15		Anegada - - -	9 0	1½	
" Santa Elena -	4 0	17		Gorda Sound, }		1½	
Nuevo Gulf -	7 0	10		Virgin Island - }	8 30	1½	
Port San Josef -	10 0	30	25	Tortola - - -	8 30	1½	
Sea Bear Bay -	12 45	20		Culebra or Pass- }		1	
Port San Antonio -	10 40	28		age Island - - }	9 0		
Rio Negro -	11 0	14		Christiansted, }		¾	
San Blas -	2 0	12	10	Santa Cruz - - }	7 30		
Colorado River -	4 0	9	7½	San Juan, Porto }		1½	
Union Bay -	3 10	12	9	Rico - - - }	8 2		
Port Belgrano -	6 0	12	10	Saintes - - -	6 45		
Tristan d'Acunha -		8		Inagua - - -	8 0	3½	2
Rio de la Plata -	noon	irr.	irr.	Mira-por-vos -	9 30	3	2
Buenos Ayres -	noon	irr.	irr.	Stirrup Cays -	7 0	4	
Santa Catharina I. -	2 30	3		Crooked Island -	7 0	2½	
San Sebastian -	2 0	4		Exuma - - -	7 20	2½	
Ilha Grande -	12 30	5	4	ClarenceHarbour, }		4	
Rio Janeiro -	3 0	4	3	Long Island - }	8 30		
Porto Frio -	2 40	4½		Rugged Island -	8 0	3	
Benevente -	3 0	5		Mucaras Reef -	7 40	3	
Nostra Santa de }				Lobos Cay - -	7 40	3	
Victoria - - }	3 0	4		Guinchos Kay -	7 40	3	
Abrolhos - -	4 48	6		Nassau, New Pro- }		3-4	
Martin Vas Rocks -	3 45			vidence - - }	7 30		
Os Ilheos - -	4 30			S. W. Bay " -	7 30	4	
Bahia - - -	3 30	8		Salt Cay Anchorage -	8 15	4	
Maceio - - -	4 30	8½		Hanover Sound -	8 15	4	
Pernambuco -	4 45	8	6	Douglas Road -	8 30	4	
Parahayba -	5 0	9-12		Abaco - - -	8 0	3	
Cape St. Roque -		8-10		Gun Cay - - -	8 30	3	
As Rocas - -	5 15	10		Memory Rock -	7 50	3	
Fernando Noronha -	4 0	6		Bluff Cay - -	7 0	4½	
Aracati - - -	6 0	8		Puerto de la Plata, }		3?	
Jericoacoara -	11 30	12	6	St. Domingo - }	7 30		
Maranhã - -	7 0	17½		Mancenille Bay -	7 0	4-5?	
San Joao - -	6 24	14		Fort Dauphin -	7 0	5½	
Para - - -	12 0	11	10½	Cape Haiti, St. }		3	
Cayenne River -	3 45	6		Domingo - - }	6 0		
Maroni River -	5 30	8		Lacul Harb. " -	6 0?	3?	
Surinam - -	6 0	5½		Gonaives Bay " -	8 0?	1?	
Corentyn River -	5 10	8½	6	Bay of St. Mark " -	8 0?	1?	
Berbice - -	4 30	11?	6	Port au Prince " -	8 0?	1?	
Demerara River -	4 45	9	6	Caimites " -	8 0?	1?	
Orinoco R. (entr.) -	6 0	3		Bay of Aux Cayes " -	uncertain	2-3?	
Chacachacare Id. }				Flamand Bay " -		2-3?	
Trinidad - - }	3 30	4		St. Louis Bay " -		2-3?	
Dragons Mouth " -	3 0	4		Aquin Bay " -		2-3?	
Port Spain " -	4 30	4	3	Jacmel " -		2-3?	
Tobago - - -	irr.	3½		Havana, Cuba -		3	
Cartagena - -	11 0	1½	1	Cape St. Antonio, }		1½	
Caledonia Harbour -	11 40	1½	1	Cuba - - - }			
<i>Caribbean Sea and the Bahamas.</i>				Port Royal, Ja- }	11 0	1	
				maica - - - }			
Barbadoes - -	irr.	2		<i>Bermudas.</i>			
Grenadines - -	3 0	1½		Ireland Id. Dock }	7 14	4	
Grenada, (St. }				Yard - - - }			
George Harb.) -	2 40	1½	¾				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
merica, East Coast. (Isthmus of Panama to the Northward.)							
	h. m.	ft.	ft.		h. m.	ft.	ft.
ra -	9 0	1½		St. Augustine* -	8 21	5	4
ds -	1 50	2		St. Johns River* -	7 28	5½	5
lands -	1 45	2		Fort Clinch, Fer- nandina* -	7 53	6½	6½
illa Cay, } Cays - }	2 0	2		St. Simons Island* -	7 43	8½	6½
War Cay -	8 10	4		Doboy Lighthouse* -	7 33	7½	7
racias Harb. -	10 30	2		Savannah (City)* -	8 13	7½	6½
Harbour, } in - }	7 45	3½		Fort Pulaski, Sa- vannah (entr.)* -	7 20	8	7
lla Bank -	irr.	2		Hilton Head* -	7 19	7½	6½
Bank -	irr.	2		St. Helena Sound* -	7 8	7½	6
vidence -	irr.	1		North Edisto R.* -	7 10	7	5½
Island -	9 0	1½		Charleston* -	7 26	6	5
s Harbour -	9 30	1½		Bulls Island Bay -	7 16	5½	4½
l -	8 30	1½		Georgetown* -	8 40	4½	3½
stocche -	9 30	1		South } Island* - }	7 56	4½	3½
he -	1 45	2½	2	Wilmington* -	9 6	3	2½
-	-	2		Cape Fear River } (Smithville)* - }	7 19	5½	4½
de Terminos -	noon	1½		Bald Head* -	7 26	5	4½
es -	-	1½		Beaufort* -	7 26	3½	2½
locks -	noon	1½		Ocracoke Inlet* -	7 4	2½	2
ruz -	-	2		Hatteras Inlet* -	7 4	2½	2
United States.				(Chesapeake Bay and Rivers.)			
, Louisiana, Mississippi, Florida, Georgia, and S. & N. Carolina.)							
R. (entr.)* -	irr.	1½		Cape Henry -	7 40	4	
Pass, Texas* -		1½	3	Cape Charles -	7 45	5	
on -		1½	4	Old Point Comfort* -	8 17	3	2½
Pass* -		1½		James R., City Point* -	2 11	3	2½
u River* -		2½	1½	Richmond* -	4 28	3½	2½
on Bay } ance)* - }	irr.	2½	1½	York R. (Moody's } Wharf) - }	9 35	3½	
aya Bay* -	irr.	2-2½		Piaukatan River } (Cherry Point) - }	10 5	2	¾
lier Bay* -	irr.	2		Tappahannock* -	0 42	2	1½
ia Bay } nee)* - }	irr.	1½		Rappahannock } (Saunders Wharf) }	3 2	2½	2
ppi S.W. pass -		1½	¾	Point Lookout* -	12 58	2	1½
-	irr.	2		Annapolis* -	4 38	1	1
-	irr.	1-2		Chester R. (Rock- hall Creek)* -	5 23	2½	1
ola -		1½		Patapsco River } (Bodkin Point)* }	5 42	1½	1
brews Bay* -	irr.	1-2		Baltimore* -	6 33	1½	1½
rges Sound } entrance)* }	irr.	2½-4		(Delaware Bay and River.)			
dle entr.)* -	1 31	1½	1½	Cape Henlopen -	8 0	4½	
icola Bay -		2½-4		Delaware Break- water* -	8 0	4½	3½
rks* -	1 14	3	2½	Higbees, Cape May* -	8 33	6½	5½
Cays* -	0 51	3½	2½	Egg Island Light* -	9 4	7	5½
Bay* -	11 21	1½	1½	Mahons River* -	9 52	7	5½
as* -	9 56	1½	1	New Castle* -	11 53	7	6½
est* -	9 30	1½	1½	Philadelphia* -	1 18	6½	5½
est, N.W. } nel)* - }	9 10	1½	1½				
ay* -	8 40	2	1				
Cay* -	8 23	2½	1½				
lorida* -	8 34	1½	1½				

be United States Coast Survey, the times of High Water being the Corrected and not the Vulgar Establishment.

Place.	High Water Full and Change.	Rise.		Place.	High Water Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
(New Jersey.)							
Cape May Landing*	h. m. 8 19	ft. 6	ft. 5	St. George Shoals	h. m. 10 30	ft. 7	
Cold Spring Inlet*	7 32	5½	4½	Monomoy* - -	11 58	5½	
Little Egg Harbour	7 10	4½	3½	Provincetown* -	11 22	10½	
(Long Island Sound.)				Wellfleet* - -	11 5	13½	
Watch Hill* -	9 0	3	2½	Cape Cod - -	11 30	13	
Stonington* -	9 7	3½	3	Barnstable - -	11 22	10	
Little Gull Island*	9 38	3	2½	Plymouth* - -	11 19	11½	
New London* -	9 28	3	2½	Boston Light* -	11 12	11	
New Haven* -	11 16	6½	5½	Boston (Charles-town Naval Yd.)*	11 27	11½	
Bridgeport* -	11 11	8	6½	Marblehead - -	11 30	12	
Sheffield Island*	10 58	8½	7½	Salem* - -	11 13	10½	
Oyster Bay* -	11 7	9½	8	Gloucester Harbour*	11 4	10½	
Sands Point* -	11 13	9	7½	Rockport* - -	10 57	10½	
New Rochelle* -	11 22	8½	7½	Annisquam* - -	11 0	10½	
Throgs Point* -	11 20	9½	7½	Ipswich* - -	11 26	10½	
(New York to Portland.)				Newburyport* -	11 22	9	
Tarrytown* -	9 57	4	3½	Portsmouth* -	11 23	10	
New York* -	8 13	5½	4½	Portland* - -	11 25	10	
Sandy Hook* -	7 29	5½	5	Kennebec River			
Hell Gate Approaches* :				(Hanniells Point)* - -	11 15	9½	
— Long Island (Blackwells Dk.)*	9 59	6	5½	Mount Desert Id. -	11 10	13	
— N. of Astoria Ferry* -	9 48	6½	5½	Bay of Fundy, Nova Scotia.			
Pot Cove, (S.E. part)* -	10 48	8½	6½	Cape Sable, Barrington Bay, (Clam Point) -	8 27	8½	
— Wards Island (Paupers Dock)*	10 9	6½	5	Cape Sable, Clarke's Harbour -	8 58	11	
Montauk Point* -	8 20	2½	2	Pubnico - -	9 25	12	
Block Island* -	7 36	3½	2½	Argyle, (Jones Anchorage) -	9 27	12½	
Point Judith* -	7 32	3½	3½	Seal Island (Cape Sable) - -	9 49	12½	
Newport* - -	7 45	4½	4	Ellenwoods Anchorage -	9 54	13	
New Bedford, entrance* -	7 57	4½	4	Jebogue - -	10 4	15	
Bird Island Light*	7 59	5½	4½	Yarmouth - -	10 9	16	
Kettle Cove* -	7 48	5	4½	Sandy Cove E., St. Mary's Bay }	10 33	21½	
Cuttyhunk* -	7 40	4½	3½	Petit Passage -	10 41	22	
Quicks Hole (S. Side)* -	7 36	3½	3	Grand Passage -	10 43	20½	
" (N. Side)* -	7 31	4½	3½	Sandy Cove, West	10 47	23	
Menemsha Bight*	7 45	4	2½	Digby Gut - -	11 0	27½	
Woods Hole (entr. from Vineyard Sound)* -	8 34	2	1½	Port George -	11 17	32	
— (entrance from Buzzard Bay)*	7 59	4½	4	Isle Haute - -	11 21	33	
Tarpaulin Cove* -	8 4	2½	2½	Black Rock - -	11 29	36	
Gay Head - -	7 37	7		Spensers Anchorage	11 42	39	
Holmes Hole* -	11 43	1½	1½	Parsboro, Basin of Mines }	12 17	43	
Edgartown* -	12 16	2½	2	Horton Bluff " -	12 30	48	
Hyannis* - -	12 22	4	3	Noel " - -	12 41	50½	
Nantucket* -	12 24	3½	3	Bay of Fundy, New Brunswick.			
				Seal Cove, Grand Manan - }	10 54	20	
				Machias, Seal Island - -	11 5	18	

\* From the United States Coast Survey, the times of High Water being the Corrected and not the Vulgar Establishment.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.				
l Harbour, } and Manan - } Quoddy - } Head, Grand nan - } au - } og Harbour - } obello elchpool) - } hn Harbour , - } rs Cove (near Chignecto) } stone Island - Point uth of Petit- liac River - } erland Basin, ckville) - }	11 7 11 12 11 16 11 18 11 19 11 21 11 21 11 35 11 35 11 47 11 49 11 55	21 21 22½ 24½ 23½ 23½ 27 30 37 41 45 45½	17½ 17 18½ 21 20 20 23 25 30½ 34½ 38 38	<i>Prince Edward Island.</i>			
	h. m.	ft.	ft.				
East Point - Cardigan Bay - Cape Bear - Charlottetown - Crapaud - Bedesque Harbour - Minimegash - Egmont Bay - Cascumpeque Hr. - Richmond Harb. - Cape Turner - Grand Rustico - Tracadie - St. Peter Harbour - Boughton Harb. -	8 30 8 40 9 0 10 45 10 0 10 15 3 30 3 0 5 40 6 0 6 10 6 40 7 0 8 30 8 40	3½ 5 6 9½ 8 7 5 4 3 3 4 4 3½ 4 5	2 3½ 3 7 6 5 3 2 2 2 2 2 2 2½ 2½	<i>Cape Breton Island.</i>			
Port Hood - Gut of Canso (Plaister Cove) } Mabou River - Chetican - Cape North - St. Anne Bay - Sydney Harbour - Menadou Bay - Louisburg Harb. - St. Peter Bay - Habitants Harbour Arischat - Bear Head - Poulament Bay, Madame Island - } Grande-digue, "	9 0 9 15 9 0 8 15 8 0 8 34 8 15 8 15 8 0 7 30 8 20 8 10 8 30 7 50 7 55	4½ 4 4 3½ 4 6 5 5½ 5 6 6½ 5 4½ 6½ 6½	2 2 4 4½ 4 4 4 4 4 4 4 3 4 4½	<i>Labrador and Gulf St. Lawrence.</i>			
St. Lewis Cape - Chateau Bay - Red Bay - Bradore Bay - Belles Amour Bay Bonne Esperance Harb. - } Mistanoque - Antrobus Island - Wapitagan Harbour Coacocho Bay - Kegashka Bay - Little Natashquan - Appetetat Bay - Betcheween Har- bour - } Clearwater Point - Mingan Harbour - Mingan Island - Bay of Seven Is- lands - }	6 30 7 35 7 45 8 45 9 0 9 15 10 30 10 30 10 30 10 45 11 0 11 10 11 32 11 30 1 16 1 30 1 40	3½ 3½ 4 4½ 5 5 6 5 5 5 5 5 5 6 6 9	1 1½ 2 2½ 2½ 3 3 3 3 3 3 3 3 4 4 5	<i>Nova Scotia.</i>			
Harbour - arne - d Island - Mouton - pool Bay - Metway - le Have } ectacle Id.) Island, N. side " S. side x Harbour - e Harbour - Harbour - Harbour - nb Harbour - r Harbour - haven - Harbour - Harbour - orough - uet - George - omish - Harbour - a Harbour - Sound - agouche - e Harbour - sh Harbour erte -	8 12 8 4 7 59 7 54 7 50 7 50 7 48 7 30 6 30 7 49 7 45 7 54 8 6 8 0 7 40 8 0 7 48 8 0 8 20 9 15 9 15 10 6 10 0 10 0 10 30 10 0 10 30 10 30 10 0	7 7 7½ 7½ 8 8 7 4 4 6 6½ 6½ 6½ 6½ 6½ 6½ 6½ 6½ 6½ 4 4 4 8 8 8 7 9	5½ 5½ 6 5½ 5 5 5½ 4 5 4½ 4½ 4½ 4½ 4½ 4½ 4½ 4½ 4½ 4½ 2½ 2 3½ 4 4 4 4 5	<i>New Brunswick.</i>			
ain Island - Harbour -	9 30 { 1 0 } 8 0 }	6 4	3 2				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
				<i>Newfoundland.</i>			
Anticosti Island } (East Cape) - }	h. m. 1 0	ft. 5	ft. 3	St. Pierre -	h. m. 8 33	ft. 6½	ft. 4½
" Bear Bay -	1 10	5	3	Lamalin Harbour -	9 15	8½	
" West Point -	2 0	6	4	Great and Little } Laun - }	8 15	7	4
Cawee Islands -	1 50	9	5	Great St. Law- rence Harbour }	8 30	7	4
Egg Island -	2 0	11	6	Burin Harbour -	8 45	6½	
Point de Monts -	12 0	12	6	St. Mary Harbour -	7 40	7½	5
Cape Chatte -	12 0	13	8	North Harbour -	8 0	7½	5
Godbout River -	1 52	11	6	Cape St. Mary -	8 30	7	5
St. Nicholas Harb.	1 55	12	7	Placentia -	8 30	7	5
Manicouagon River	2 15	12	7	Trepassey Harbour	7 0	6½	5
Bersimis River +	2 0	12	7	St. Johns -	7 30	7	
Bic Island -	2 15	14	8½	Harbour Grace -	7 30?	7?	
Port Neuf -	2 10	13	8	Bull Id., Trinity Bay	7 22	3½	2
Matan River -	2 15	11	7	Barrow Harbour -	7 10?	5?	
Little Metis -	2 10	13	8	Fogo Island -	7 20	4	
Saguenay, Tadoussac	2 45	17	10	Funk Island -	7 0?	2-3?	
" Chicoutimi	4 11	12	8	Triton Harbour -	7 0?	2-4?	
<i>River St. Lawrence.</i>				Cutwell Harbour -	7 0?	2-4?	
Green Island -	2 45	16	9½	Fleur de Lis Harb.	7 0?	2-4?	
Brandy Pots -	3 0	17	10	Rouge Harbour -	7 0?	2-4?	
Coudres Island } (Prairie Bay) - }	4 25	17	10	Croc Harbour -	6 30?	4?	
Pillars -	5 0	17	10	St. Julien Harbour }	7 21 A.M. 6 30 P.M.	4½	3
Crane Island, } Middle Traverse	5 24	17	13	Goose Cove -	7 0?	2-3?	
Orleans Island, } North Traverse	5 40	17	13	Braha Harbour -	7 0?	2-3?	
Quebec -	6 38	18	13	Lunaire Bay -	7 0?	2-3?	
Carouge River -	7 15	16	11	Grignat Bays -	7 0?	2-3?	
Frechette Island -	8 0	14	9	Sacred B., (N. Cst.)	7 23	2½	
Port Neuf -	8 30	14	9	Cook Harb. (N.Cst.)	7 25	3?	
Grondine -	9 0	9	6	Port-au-Choix, } (N.W. Coast) - }	10 47	5	
Cape Roche -	9 30	6	4	Petit Port, Bay of } Islands - }	10 42	5½	
Champlain -	9 45	3	2	Codroy Island -	9 15	6	
Batiscan -	9 48	3½	2	Port Basque -	8 55	5½	
Antigonish Harb.	9 0	4	2	La Poile Bay -	9 0	6	
Three Rivers -	11 30	1		<i>Hudson Strait.</i>			
<i>Gulf St. Lawrence.</i>				Button Islands -	6 50		
St. Paul Id. -	8 0	5	3	Fury and Hecla } Strait, Melville	7 0	8	
Magdalen Islands -	8 20	3	2	Peninsula - }			
Gaspé Basin -	2 40	5	3	<i>Hudson Bay.</i>			
Point Macquereau -	2 0	5	3	York Factory -	11 15	10-14	
Carleton Point -	3 0	6	4	<i>Arctic Regions, Greenland, West Coast.</i>			
Dalhousie Harb.	3 10	9		Julianshaab -	5 6	7	
Campbell Town, } Ristegouche R. }	4 0	10	7	Frederickshaab -	6 3	12½	
Bathurst -	3 15	7	4	Holsteinborg -	6 30	10	
Shippigan -	3 42	5½	3	Upervivik -	11 0	8	
Carquette Harbour	2 40	6	3	Wolstenholm } Sound - }	11 8	7½	
Miscou -	2 30	5	3				
Miramichi Bar -	5 30	5	3				
Sheldrake Island -	6 0	5	3				
Vin Harbour -	5 45	5	3				
Beaubère Island -	6 30	6	4				
Point Escumenac -	4 10	4	2½				
Richibucto River -	3 30	4	2½				
Buctouche River -	7 0?	4?	2?				
Cocagne River -	7 30?	4?	2?				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Barrow Strait.</i>							
	h. m.	ft.	ft.		h. m.	ft.	ft.
Leopold	12 6	6	4½	Port Cockburn, }	4 15	12	
s Bay	12 6	8		Pemba Id. }			
h Island	12 15	3¾	2¾	Melinda	4 0	11	
<i>Melville Island.</i>				Mombaza	4 15	11	
r Harbour	1 30			Lamo Harbour	4 6	11	
<i>Banks Land.</i>				Patta Bay	4 30	10	
f Mercy		2		Port Durnford	4 45	12	
e of Wales }		3		Brava	4 30	8	
ut }				Magadoxa	4 30	8	
<i>Africa, South Coast.</i>				Rás Haffún	6 15	4	
s Bay	2 44	5½	3½	Bander Alúleh	6 45	6	
Island	2 50	5		Bander Gori	8 45		
Agulhas	2 50	5		Berbereh or }			
l Bay	3 15	6		Burburra (Gulf }	7 15	9	
Harbour	3 45	5		of Aden) }			
nberg Bay	3 10	6		Zeyla	7 15	8½	
Bay or Bay }	3 30?	6?		Ghubbet Ne, Socotra	7 0	7	
Bras }				Gollonsir	7 20	8	
Bay	4 0	4-5		Bander Sháab	7 0	7	
Islands	4 0	4-5		Abd-al-Kuri	8 30	6	
loo Bay	4 0	6		Kal Farun	8 20	6	
o River (en- }	3 45	4½		<i>Madagascar, East Coast.</i>			
ce) }				British Sound	4 0	9½	
hn River	4 0	5		Port Leven	3 30	7½	
Natal	4 30	6		Andrava Bay	3 30	7	
a Bay, Eng- }				Antongil Bay }	4 0	5	
River (Por- }	5 20	12		(Port Choiseul) }			
ese Factory) }				Tangtang Harbour	4 30	6	
Port Melville }	4 30	15		Madame Island, St. }	4 0	5	
between Island }	4 40	12		Mary Harbour }			
<i>Africa, East Coast.</i>				Tamatave	4 18	8	
ibane River	4 15	10		Fort Dauphin	4 30	7	
Bazaruto	4 15	10		<i>Madagascar, West Coast.</i>			
River	4 0	19		St. Augustine Bay	4 30	13	
ane River }	4 15	16		Noss or Sandy Id.	5 0	15	
rance) }				Cape St. Vincent	4 45	12	
River (en- }		22		Mourondava	4 45	12	
ce) }				Barren Islands	4 45	12	
ra River		13		Boteler River	4 30?	15?	
nbique Har- }	4 15	12	11	Boyanna Bay	4 30	15	
r }				Makumba River	4 45	17	
a Bay	4 0	15		Bembatooka Bay	4 30	16	
Harbour	4 15	6		Majambo Bay	4 30	16	
o Island	4 30	7		Narrinda Bay	4 30	15	
Delgado	4 0	16	11½	Port Mazambo	4 30	15	
na River	4 0	16	11½	Port Radama	4 40	13	
River (en- }	4 15	12		Passandava Bay	5 0	15	
ce) }				Dalrymple Bay	5 0	15	
allo or }	4 45	12		Minow Islands	5 0	15	
gallo River }				St. Juan de Nova		5	
	4 45	12		<i>Red Sea.</i>			
n Island	4 0	10		Bab-el-Mandeb St.	12 0	7	
ar (Channel)	4 15	11		Mocha Road (East }	12 0	4½	
ar	4 20	10		Coast) }			
Channel	4 0	11		Murdounah Island }	6 0	3	
				(East Coast) }			
				Ushruffi Islands	6 14	2	
				Massowah	1 0	3	



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	N.
<i>Hindoostan, West Coast.</i>							
Omaider Island } (Gulfof Akabah)	h. m.	ft.	ft.	Manora Point (en- trance to Karachi Harbour)	h. m.	ft.	
Rás Mahommed } (Gulfof Akabah)	6 0	4		Gizree Bunder } (Mouth of Indus)	10 30	9½	
Jiddah -		2		Pitty -	9 50	7	
Sale Macowa -	0 30	2		Dunbar -	10 5	9	
Loheia -	1 30	3		Kedewarry -	10 10	8	
Suez Bay (head of Gulf)	2 0	6		Hukkar River (en- trance)	9 57	9	
<i>Arabia, S.E. Coast.</i>							
Bab-el-Mandeb } Strt. (Perim Id.)	12 0	7		Koree River (Mon- da Point)	10 30	11	
Bander Feikam -	10 0	8½		Bate (Gulfof Cutch)	11 40	11	
'Aden (Back Bay)	9 30	8½		Jooria -	12 20	12	
Sughrá -	8 0	6		Gooriya Creek } (entrance)	2 0	16	
Makátein -	9 0	6		Mandavee Roads -	11 0	9	
Rás-al-'Asidah -	8 30	5½		Jaffrabat -	11 50	15	
Makalleh -	8 30	7		Raujpoor (entrance, Gulf of Cambay)	11 35	9	
Rás Sharmah -	9 0	8		Diu Island -	2 15	18	
Merbát -	9 0	6¾		Surat -	2 0	6	
Kuriyán Muriyán } Bay & Islands	8 20	6½		Damaun (Bar) -	4 0	19	
Cape Isolette -	9 0	10		Versavah -	1 30	17	
Sháb Kadún -	9 20	10		Nansaree River, } (Bar)	0 15	16	
Jezírat Hamar-al- nafur -	9 30	10		Gundavee River } (entrance)	3 0	18	
Sháb-'bu-saifeh -	9 45	10		Bulsaur R. (entr.)	2 0	19	
Ghubbet Hashish -	10 0	10		Omersary River -	1 45	18	
'Om-rasas-Masirah	10 0	10		Danno River -	1 45	18	
Rás Shébali -	10 0	10		Manorah River -	1 30	17	
Rás-al-Hed -	9 30	9		Bombay Dockyard	1 30	16	
Khór Jerameh -	9 30	10		Rajahpoor Harbour	11 40	12-17	
<i>Persian Gulf.*</i>							
Maskat -	11 15	6		Bancott River } (entrance)	11 0	12	
Jezírat Jún -	11 30	10		Geriah Harbour -	2 0	12	
Rás al Kheī meh -	11 45	7		Angria Bank -	2 40	9	
Al Bida' -	8 30?	6?		Dewghur Harbour -	10 30	9	
Bahreīn -	5 30	7		Goa -	11 25	9	
Jezírat Arabī -	6 30?			Sedashigur Bay†	11 30	6	
Jezírat Kabr -		8½		Agoda Point -	10 0		
Kowcit -	0 15	9		Merjee River -	10 30	9	
Basrah (Bar) -	12 0			Calicut Roads -	11 0	7	
Jezírat Kharg or } Kháreg -	8 0	6½		Beypoor River (en- trance)	0 15	5	
Abú-shehr -	7 30	7		Cochin Harbour } and Road	0 15	5	
Umm en Nakheī- lah -	7 30?	8?			1 0	3½	
Tahrī -	5 0?			<i>Ceylon, South Coast.</i>			
Jezírat Kais -	0 45	7½		Colombo -	1 0	2	
Jezírat Tumb -		8		Dodandowe Bay -	1 50	1½	
Lingeh -	12 0?			Pointe de Galle -	2 0	2	
Básidúh -	12 0	10		Belligam or Red Bay	2 20	2½	
Kesm -	11 0	12		Kirindi -	3 30		
Jezírat Lárek -	10 15						
Basrah Town -	6 0?	9					

\* Deduced from observations made in the E.I.C. brig Euphrates 1857-58, and H.M. schooner *Mari* the Indian Navy, 1858-60, by Commander G. C. Constable and Lieutenant A. W. Stiffe of the Indian Navy.

† Spring tides rise, a.m. 6 feet, p.m. 7½ feet from October to March; and the contrary during the of the year.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
also River -	5 0	2-3		St. Paul Island -	11 0	3	
malce Har- }	8 18	2	1½	Amsterdam Id. -	11 0	3	
ira Point -	9 30	7-11		Mauritius, Port }	12 30	3	2½
				Louis - - }			
<i>Bay of Bengal, West Coast.</i>				Port - - }	1 0	1½	
arin Har- }	1 15	2½	1½	Reunion or Bour- }	Noon	3½	
and Road, }				bon Island, }			
f of Manar) }				(St. Pierre) }			
carry -	11 0			" (St. Denis) -	0 22	2½	
ben Pass -	1 30	2		" (St. Gilles) -	1 0	2½	
atnam(West }				" (St. Paul) -	1 7	4	
of Falk }	11 0	1½		Rodrigue Island -	1 45	6	
t) -				Cargados Garayos }	2 0	4	
atam -	5 0	3		Shoals -			
e -	8 15			Chagos Archipel- }			
as Road -	7 34	3½		ago, (Diego) }	1 30	6	
it Shoals -	9 25	2½		Garcia) -			
Point -	8 0	8		Seychelle Archi- }			
Divy -		5		pelago, (Mayhé) }	4 0	6½	
ga Bay -	9 10	4-5	3	Island) -			
River (Bar) }	9 0	5		Curieuse Island -	5 10	7	
ore River -	10 0	15		Peros Banhos -	1 30	5	
ree -	11 30			Amiranté Isles, }	5 0	8½	
r Island -		12		(St. Joseph I.) }			
ern light ves- }				Comoro Islands, }	3 30	8½	
(entrance to }	10 0	10½		(Johanna Island) }			
ogly) -				Comoro Islands, }	4 10	11½	
th River (en- }				(Mayotta Is- }			
ce to Bid- }	10 0	14		land, N.W. end) }			
h River -				Maldives, Adou }	1 0	4	
da Kali) -	11 45	15		Atoll -			
ta -	2 30			" Suadiva }	1 0	4	
				Atoll -			
<i>Bay of Bengal, East Coast.</i>				Maldives, Adou }	3 0	4	
ngs Harbour }				Matte Atoll }			
ergui Archi- }	10 40	13½		" Malé }	12 30	3	
go) -				" Malcolm }	10 30	3	
ui -	10 30	18		Atoll -			
y River, (en- }	10 30	20		" Heawandou }	9 30	5	
trance) -				Pholo Atoll }			
nain -	2 0	22	17	Laccadives, Cher- }	10 0	7	4
ban -	2 20	21		baniani Reef }			
mR.(entrance) }	3 15	21	14	Tamareed, Socotra }	7 20	8	
on -	5 30	21	14	Keeling Islands }	5 30	5	
in River -				(Port Refuge) -			
rance) -	10 0	9	6	Christmas Id. -	10 0		
ee Road -	10 0	12		Nicobar Islands, }			
b, Aracan }	9 45	9	6	Nancowry Har- }	9 15	8½	
er (Bar) -				bour -			
River (en- }	10 0			Andaman Islands, }	10 0	8½	
ce) -				Port Cornwallis }			
ba Island -	11 30	8		" Andaman }	10 24	9½	
nd Island -	10 30	8		Strait -			
gong (Bar) -	1 15	15	10				
<i>Islands in Indian Ocean.</i>				<i>Malacca Strait, Malay Coast.</i>			
elen(Christ- }	2 0	2		Junkseylon Island }	10 0	11½	
Harbour) -				(East side) -			
				Queda -	12 0	5½	
				Penang (George- }	12 0	9	7½
				town) -			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
				<i>Sumatra, N.E. Coast.</i>			
Lt. Vessel (One Fathom Bank) }	h. m.	ft.	ft.	Pulo Aor -	h. m.	ft.	ft.
Arroa -	6 0	15	12	St. Barbe -	-	5	-
Cape Rachada -	-	10	-	Badas Id., Linga }	6 0	6	-
Sambilangs -	5 30	13	10½	Bay† -	6 0 P.M.	12	-
Malacca Road -	-	12	8½	Delhi River -	-	4 0	8
Off Mount Formosa	7 30	11	8½	<i>Sumatra, West Coast.</i>			
Tanjong Bolus	8 0	11	8½	Bencoolen -	6 0	3-5	-
North Sands	9 30	10½	8½	Sillebar River (Bar)	6 0	4½	-
Singapore, New Harbour }	5 30	15	12½	Mensular Island	-	4	-
Rhio -	9 45	10	7½	(S.E. end) }	6 0	-	-
	-	7	5	Tappanooly Har-	6 10	6	-
				bour -	-	8	-
<i>Malacca Strait, Sumatra Coast.</i>				Acheen Head -	8 45	-	-
Diamond Point -	12 0	9½	-	<i>Durian Strait.</i>			
Siak River (en-	9 0	12	-	Sabon Island -	-	10	-
trance) -	-	-	-	Deep Point -	5 0	10	-
„ off the town -	-	11	-	Red Island -	5 0	10½	-
<i>Timor, East End.</i>				<i>Banka Strait.</i>			
Koepong -	11 0	9	6½	Toboe Ali Point -	8 30 P.M.* } 10 0 A.M.† }	12	-
<i>Sumba or Sandelhout, North Coast.</i>				Lucipara Pass -	irr.	10	7½
Nangamesie Har-	11 30	17	13½	Nangka Island -	7 0	9½	-
bour -	-	-	-	Cape Oelar -	6 30	12	-
Palmedo Road -	-	15	-	Bersiap Point -	6 30	12	-
<i>Sumbawa.</i>				Kalian Point -	8 17†	12½	-
Ragged Island -	8 10	3	-	Lobah Point -	11 0*	10	-
Sapie Bay -	1 0	10	-	<i>Gaspar Strait.</i>			
Britannia Bay -	1 0	11-12	-	Pulo Mendanao -	2 30	4	-
Bima Bay -	Noon	6	-	Pulo Leat -	2 30	4	-
<i>Lombok, West Coast.</i>				<i>Java Sea.</i>			
Ampanam Bay -	8 0	6	-	Crimon Islands -	8 0	6	5
Pidioe Bay -	-	10-12	-	<i>Celebes.</i>			
<i>Baly.</i>				Macassar -	4 40	5½	-
Badong Bay }	11 0	9½	-	<i>Flores Sea.</i>			
(South Coast) -	-	-	-	Adenara, Flores -	-	8	-
Tebonkos Road }	5 0	6½	-	<i>Moluccas.</i>			
(North Coast) -	-	-	-	Batchian, Gilolo -	1 0	6	-
<i>Java.</i>				Sanguir Island -	-	6	-
Pampang Bay -	-	7-8	-	Gèby, Fohou Island -	-	5	-
Tylatiap Harb. }	8 45	3½	-	Wahaay Harbour, }	6 0	3	-
(South Coast) -	-	-	-	Ceram -	-	-	-
Wynkoops Bay }	5 0	5½	4	Bouro, Cajeli Bay -	1 0	6	-
(S.W. Coast) -	-	-	-	Amboyna -	0 33	7	-
Bantam -	-	5	-	Saparocoo Island -	-	6	-
Batavia -	10 0	2	-	Cambing or Pas-	noon	6	-
Krakatoa -	7 0	4	-	sage Island -	-	-	-
				Banda, Banda Islands	4 0	6?	-
				Dampier Strait -	-	11	-

\* In S.E. Monsoon.

† In N.W. Monsoon.

† From observations made in the month of September by W. Stanton, Master commanding H.M. Surveying Brig, Saracen.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	N.
	h. m.	ft.	ft.		h. m.	ft.	
Nhatrang Bay } (Cochin China, E. Coast -	8 30	5½		Hoo-e-tow Bay -	12 15	16	
Hon-cohe Bay „	11 30	5		Chimmo Bay -	10 20	16	
Turon Bay „	3 0	4		Chinchew Harbour	12 25	17	
Galang Bay } Hainan Island,		4-5		Meichen Sound -	12 30	17	
Tien-pak Harbour } (China, E. Coast)	12 0	8½		Hai Tau Strait -	12 15?	16?	
Pratas Shoal -	4 0	5		White Dog Ids. -	9 0	18	
Canton River } (entrance) -	10 0	8		Min River, Tem- ple Point -	10 45	19	
Broadway River } (entrance) -	11 0	7½		Min River, Lo- sing Island -	12 0		
San-shui, Si Kiang } or West River.		5-6		Chang-chi Island -	9 30	17	
Shao-king „ -		3		Spider Island -	10 0	17	
Wuchan „ -		1-1½		Lishan Bay -	10 15	16	
Typa Anchorage -	10 0	7		Namquan Harbour	10 0	17	
Macao -	10 0	6½		Namki Islands -	8 30	17	
Hong Kong Road-	10 15	4½		Pih-ki-shan Ids. -	8 30	17	
Lintin Id. Canton } River -	12 0	7½		Fong-whang- group, Bullock } Harbour -	8 30	17	
Fan-si-ak Channel } Canton River -	1 0	7½	5	Wan-chew River } (entrance) -	9 0	15½	
Chuen-pee Point } Canton River -	2 0	7½		„ City -	9 30	15½	
Kuper Id. { Mar. -	2 40	5½		Tai-chow Islands -	9 0	14	
Canton R. { May & June -	1 40	5½		St. George Id. } San-moon Bay -	10 20	15	
* Wham- { Mar. -	1 40			Kweshan Islands -	9 30	14	
poa Dks. { April -	1 15	7-8		Nimrod Sound -	10 30	20	
„ { May & June -	0 30			Vernon Channel, Chusan Archi- pelago -	9 40	14	
Canton, City -	2 40			Ting-hae Harbour	11 0	12	
Ninepin Group -	10 0	5		Poo-too Island -	8 15	12	
Tide Cove, Mira Bay	10 0	6½		Lansew Bay -	10 0	13	
Tooni-ang Id. Bias } Bay -	8 0			Volcano Islands -	11 30	15	
Tsang-chow Id. } Bias Bay -	8 30			Fast Saddle Island	11 0	14	
Hong-hai Bay -	10 0	6½		Yung River, Chin- hae -	11 20	12½	
Kin-siang Point, } Hie-chechin Bay }	7 0			„ Ning- po-fu -	1 0	9	
Cupchi Point -	8 0			Hang-chu Bay, } Sesham Ids. -	11 45	14	
Hai-mun Bay -	9 0	7?		„ Fog } Islands -	11 45	17	
Cape of Good Hope	9 0	7?		„ Chapu } Road -	12 0	25	
Clipper Road, Na- moa Id. -	11 15	7		Hang-chu Bay } (off Can-pu) -		32	
Chauau Bay -	11 0	6½		Gutzlaff Island -	11 30	15	
Tongsang Harbour	11 30	12		Yang-tse Kyang } (entrance) -	12 0	12	
Chimney Id. Rees } Pass -	11 30	12		„ entrance } to Wusung } River -	0 30	15	1
Makung Harbour } (Pescadores) -	10 30	9½	7	Shanghai -	0 40	10	
Amoy, Inner Har- bour -	12 0	16		† Langshan Crossing	1 40	12	

\* At Whampoa Docks—In March, the day and night tides rise to the same level. From April to October the day tides are the higher, and from November to February the lower. In May and June the of spring tides is 4 feet, and the neaps 2 feet higher than in March.

† Deuced from Observations made in March 1861, by Commander Ward H.M.S. Acton.

Place.	High Water, Full and Change.	Rise:		Place.	High Water, Full, and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Yellow Sea.</i>				Tanabé Ki Chan- nel	h. m. 6 0	ft. 6	ft. 5½
han-kau	4 30	11	9	Uranouchi		5	
nton Island	1 30			Osaki	5 55	6½	
tan Bay	1 30			Kata	6 4	6½	
n Bay	2 40			Yura Harbour	6 5	6½	
hai-wei Har- ur	9 30	9		Naruto (Fukura)	6 17	7	
g-mun Harbour	10 0	7		Akasi	6 36	6½?	
u	10 0	8	6½	Awassima (Inland Sea)	0 14	7	
a-tau (Depôt ay)	10 35	6		Tomo (Seto-uchi)	11 0?		5
o River				<i>Gulf of Tartary.</i>			
entrance)*	3 10	10	8-9	St. Vladimir Bay	irr.	2	
l Point, Gulf				Napoleon Road	2 30	2½	
Liau-tung)	4 50	7	5½	(West Coast)			
Head of Gulf				Port Michael Sey- mour	5 30	3	
Liau-tung	5 30	10	8½	Barracouta Har- bour	10 0	3½	
Ho (Bar)	4 0	11		Castries Bay	10 30	6	
(entrance)	5 0	12		Jonquiere Bay	10 0	6	
sittarts Saddle	4 20	10	8½	(East Coast)			
shan Bay	2 30	8		Amur Strait	11 40	5-6	
Adams, Suli- van Bay-	0 15	8		<i>Kamchatka.</i>			
" Mary				Avatcha Bay	3 30	6½	4½
Island	2 0	10		<i>New Zealand:—South or Stewart Island.</i>			
son Bay	11 45	8		Mason Bay	11 10	8	6
ien-whan Bay	10 10	12	8	S.W. Cape	12 0	7	5
ounter Rock	10 30	10		Port Pegasus	11 50	8	6
- yun - tau	9 0	12		Port Adventure	12 20	8	6
nton Haven)				Patersons Inlet	1 10	8	6
Hamilton,	8 30	11		Port William	12 45	8	6
Korea, S.C.)				<i>Middle Island, East and North Coasts.</i>			
<i>Japan Sea.</i>				Bluff Harbour	1 18	8	6
g-hing Bay	5 20	2½		Molyneux Bay	3 0	8	6
a-liang-hai or bosau Harbour	7 45	7	5	Otago Harbour	2 50	7	5
(Korea)				(entrance)			
asaki Bay	7 15	9	7½	Akaroa Harbour	3 24	8	6
Nipon, South				Port Cooper	3 50	7½	5½
ast)†				Kaikora Peninsula	5 30	8	6
moeseki	8 30	8	6	Cape Campbell	6 0	8	6
(Yebisu)	5 0	2		Port Underwood	6 10	8	6
odadi Har- ur, Yezo Id.	5 0	3		Queen Charlotte	8 50	8	6
armo Har- ur, Yezo Id.	5 30	6		Sound entrance)			
erouse Strait	10 30	6		Port Gore	9 0	8	6
i-hama, Yedo	6 0	6½	4½	Pelorus Sound	9 35	11	7
y				(entrance)			
zio	6 0	5		Port Hardy	9 55	8	6
Simoda	5 0	3-5		Nelson	9 50	14	10
Bay		5½		Massacre Bay.	8 45	13	9
a Bay		4		Tasman Corner	9 50	14	10
ama Bay	5 50	5		—Motu Pipi			
dsu	7 30	7	5	River, W. Ent.	9 20	14	10
ami	7 30	6		Cape Farewell			
na	6 50	5					

\* Time and rise much affected by winds.

† Deducted from observations made in Commander 1861 by Ward, H.M.S. Actæon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Middle Island, South and West Coasts.</i>				<i>Australia, East Coast.</i>			
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
Ranpuke Id. (Fo- veaux St.) -	1 0	8	6	Monganui Harbour	8 15	9	7
Centre Id. (Fo- veaux St.) -	12 15	8	6	Awanui River -	7 44	7	
Preservation Inlet -	11 20	8	6	Parenga-renga Harbour -	7 54	7	
Chalky Inlet -	11 5	8	6	<i>Australia, East Coast.</i>			
Dusky Bay -	11 15	10	8	Twofold Bay -	10 0	7	5
Daggs Sound -	11 30	8	6	Botany Bay -	8 15	7 - 8	
Thompson Sound -	11 30	8	6	Jervis Bay -	6 20	6 - 9	
Bligh Sound -	10 45	8	6	Port Jackson, }	8 15		
Milford Sound -	9 15	8	6	North Head - }			
Wanganui Inlet -	11 20	7	6	Sydney -	8 38	4½	4
<i>North Island, South and West Coasts.</i>				Broken Bay -	8 0	6 - 9	
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>	Newcastle or Port Hunter -	9 45	6 - 7	
Port Nicholson, }	4 30	5	3	Port Stephen -	9 0	6	
Lambton Harbour }	7 0	8	6	Manning River -	10 0		
Mana Island -	9 0	6		Port Macquarie -	8 56	4 - 5	
Kapiti Island -	10 0	8	6	Shoal Bay -	8 30		
Manawatu River -	10 15	8	6	Richmond River -	9 20		
Wanganui River -	9 30	12	9	Cape Byron -	9 45	6	
New Plymouth (Taranaki) -	9 30	12	9	Tweed River }	9 45	5 - 8	
Kawhia Harbour -	9 30	12		(Danger Point) }	9 30	3 - 7	
Aotea Harbour -	10 0	12		Moreton Bay -	9 0	6 - 8	
Waikato River -	9 30	12	9	Wide Bay -	7 50	6 - 8	
Maukau Harbour }	9 30	13	10	Sandy Cape -	9 40	10 - 12	
(entrance) -	10 55	10	8	Port Curtis -	9 45	6	
Kaipara Harbour }	9 45	0		Byron Bay -	8 45	6 - 8	
(entrance) -	10 15	10	7	Wreck Reef -	8 15	3½ - 5½	
Hokianga River (entrance) -	8 0	7		Cato Bank -	9 0	7 - 8	
" (Kokohu) -	8 0	7		Lady Elliot Islet -	9 0	10	
Cape Maria Van Diemen -	8 0	7		Heron Islet, }	9 0		
Three Kings Is- lands -	8 0	7		Capricorn Group }	9 30	9 - 14	
<i>North Island, East Coast.</i>				Keppel Bay -	8 48	7	
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>	Great Barrier Reef -	8 0	6	
Cape Palliser -	6 0	6		Saumarez Reef -	8 0	6	
Hawke Bay -	7 50	3		Frederick Reef -	8 0	5½	
Poverty Bay -	6 5	6		Kenn Reef -	8 30	5	
East Cape -	8 55	7		Avon Isles -	8 30	5	
Hicks Bay -	9 0	7		Chesterfield Islet -	7 55	5 - 6	
Tauranga Harbour	7 10	6	4½	Mellish Reef (Sand Cay) -	10 45	12 - 18	
Mercury Bay -	7 21	7	5	Thirsty Sound -	9 35	16	
Gt. Barrier Island }	6 25	10	7	Port Bowen -	10 30	12 - 18	
(Nagle Cove) - }	7 5	11	9	Shoal Water Bay -	11 0	20 - 30	
Auckland Harbour	6 30	10	7	Brood Sound -	10 0	10	
Kawau Island -	7 0	9	7	Swain Reefs -	10 30	16	
Wangari Harbour -	7 0	9	7	Percy Isles, Middle Island (West Bay) -	10 30	14	
Tutukaka Harbour	7 0	9	7	" South Islet, (N.W. Bay) -	10 20	24	
Wangaruru Harbour	7 10	9	7	West Hill -	11 0	18	
Bay of Islands, }	7 15	9	6	Cape Conway -	6 45	6	
(Motu Mea Islet) }	8 15	7		Gould Island -	9 30	6	
Wangarua Harbour	8 0	7		Port Denison -	11 0	6 - 8	
Cavalli Islands -	8 0	7		Cape Upstart -	7 30	10 - 12	
				Cleveland Bay -			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.				
Island -	9 28	6 - 10		<i>Australia, West Coast.</i>			
by Island -	9 15	7 - 12			h. m.	ft.	ft.
our River -	8 0	5 - 10		Cockburn Sound -	9 0	1 - 1½	
Opening, } Barrier } Island -	9 15	7 - 12		Warnboro' Sound -		3 - 4	
Island -	9 15	7 - 10		Koombanah Bay -	9 0	½ - 3	
rs Group -	9 15	8 - 12		Port Grey, Swan	9 0	1 - 1½	
idmouth -	9 15	10		River -			
ork -	11 15	10	7	<i>Australia, South Coast.</i>			
<i>Torres Strait.</i>				Corner Inlet -	11 40	8	
Hardy Is. -	9 15	10		Wilson Promon- tory -	2 0	10	
Island -	8 10	10		Port Western -	1 10	8	6
Island -	Irreg.	7		Port Philip, Entrance	1 30	3 - 4	
Possession -	9 0	6		„ Capel Bay	2 30	3 - 4	
sion Island -	1 0	9½		„ Hobson Bay	3 0	3 - 4	
ry Island -	9 30	12		Melbourne -	1 20	3	
de Cay -	9 15	12		Lady Bay -		4	
y Islands -	9 30	10		Geelong Harbour -	2 50	2½	
hus Island -	12 15	10		Port Fairy -		4	
y Islands -	12 15	10		Portland Bay -	Midnight	4	
<i>Australia, North Coast.</i>				Macdonnell Bay -	3 0	5	
our Strait, } Entrance -	1 0	9½		Rivoli Bay -	10 0	4	
Island -	4 30	8		Port Elliot -		5 - 6	
t River -	7 30	10 - 13		Troubridge Shoals	3 30	6	
ley Isles -	7 30	8 - 12		Port Adelaide -	5 44	6	
Pellew Ids. -	7 30	4 - 7		Cape Willoughby, Kangaroo Id. -	4 10	6	
igator Road -	8 0	9		Pelican Lagoon, Kangaroo Id. -	5 0	6	
nu Bay -	8 0	6 - 8		Spencer Gulf:			
urn Isles -	6 0			Thorny Passage	12 0	6 - 8	
nor River -	8 40	19 - 20		Point Lowly -	7 0	6 - 8	
Bay -	6 0	18 - 25	14 - 20	Port Augusta* -	8 30	9 - 12	
ssington -	3 24	13		Gambier Islands -	1 50	3	
aph Bay -	5 45	14		Port Eyre -	10 30	6	
Bay -	12 0	21		St. Francis Isle, } Petrel Bay -	12 0	6	
Darwin -	5 30	17 - 24		Blancheport, } Streaky Bay -	1 0	5	
<i>Australia, North West Coast.</i>				Smoky Bay -	12 15	6	
ia River, } tle Point -	7 15	15 - 24		Denial Bay -	12 15	6	
Mosquito Flat	0 19	7 - 13		Fowlers Bay -	10 30	6	
Sandy Island	1 17	3 - 10		Venus Harbour -	2 15	6	
Frederick } bour -	12 0	28		West Cape Howe -	9 0	6	
orge Basin -	12 15	25		Princess Royal } Harbour -	11 56	1 - 4	
ing Bay -	11 45	30		<i>Bass Strait.</i>			
alty Gulf -	12 0			Refuge Cove -	12 5		
rick Bay -	12 0	24		King Island -	1 0		
n Harbour -	12 0	37½		Hunter Island -	11 30	8	
Bay -	11 45	36		Three Hummock } Island, E. side -	10 30	10	
Bay -	12 0	2-5		Swan Island -	9 35	6	
an Rocks -	11 30	2½		Glennie Islands -	12 20		
ion Bay -	9 10	1		Kent Island -	11 10		
				Murray Pass -	11 10	8	

t Port Augusta, when the wind veers round to West and South and blows strong, the rise has been as much as 16 feet. Commander John Hutchison, R.N., Admiralty Survey, 1862.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Tasmania.				South America, Strait of Magellan.			
	h. m.	ft.	ft.		h. m.	ft.	ft.
Tamar R. George } Town -	11 15	12½		Cape Virgin -	8 30	36 - 42	
" Launceston	1 0	12½		Cape Espiritu Santo	8 30	36 - 42	
Port Arthur -	7 52	4		Possession Bay -	9 0	36 - 42	
Hobarton -	8 0	4		Cape Orange -	3 0		
Macquarie Har- } bour -	7 30	3		First Narrows -	9 0	36 - 42	
Circular Head -	12 0	9		Philip Bay, east side	9 30	24	
Cape Pillar -	1 0	6		Gregory Bay -	9 45	23	
Port Dalrymple -	12 5	10	7	Second Narrows -	10 0	23	
Eddystone Point -	9 39	7		Peckett Harbour -	12 0	6	
Islands in South Pacific.				Laredo Bay -	11 30	9	
Easter Island -	2 0			Santa Magdalena } Island -	12 0	10	
Bow Island -	2 40	3		Port Famine -	12 0	6	
Tabuai Id. -		3		Cape San Isidro -	1 0	8	
Tahiti or Otaheite Id.	noon.	1½		St. Nicolas Bay -	2 6		
Resolution Bay, } Sta. Christina, } Marquesas -	2 30	4		Cape Froward -	1 0		
Fannings Id. -		4		Port San Antonio -	12 0	7	
Tongatabu -	6 50	4		Labyrinth Islands -	0 30	5½	
Port Resolution, } Tanna Island -	5 35	3		Port Gallant -	9 0	5½	
Port Aneiteum, } Inyang -	6 35	4		York Road, } English Reach }	2 0	9	
Erronau or Futuna	7 24	4		Bachelor River -	1 40	5	
Sandalwood Bay, } Fiji Islands -	6 0	6?		Borja Bay -	1 50	6½	
Port Nukulan or } Rewa Road, }	6 47	5½		Playa Parda Cove -	1 8		
Fiji Ids. -				Port Tamar -	3 5	5	
Balade Harbour, } New Caledonia -	6 30	4?		Valentine Harbour	2 0		
Port de France, } New Caledonia -	8 25	4		Harbour of Mercy -	1 22	4	
Port St. Vincent, } New Caledonia -	5 50	4½		Cape Pillar -	1 0		
Woodlark Island	7 15	4		Smyth, Sarmiento, Wide, and Messier Channels.			
Louisiade Archip. }				Goods Bay -	0 30	7	
Port Carteret, New }				Fortune Bay -	0 50	7	
Ireland -		6		Welcome Bay -	0 50	7½	
Norfolk Island -	7 45	7		Puerto Bueno -	1 40	8?	
Campbell Island -	12 0	43?		Guia Narrows -	2 10	8	
Islands in North Pacific.				Fury Cove -	1 15		
Karakoa Bay, }	3 49			Eden Harbour -	12 30	5	
Owyhee -				Halt Bay -	0 30	8	
Honoruru, Sand- }	4 0	2		Middle Island -	12 0		
wich Islands -				Tierra del Fuego, S.W. Coast.			
Pouinipet Island, }	6 0	4½		Cape Horn -	4 40	9	
Caroline Islands }				St. Francis Bay -	4 0		
Seypan Island, }	6 45	2½		St. Martin Cove -	3 50	8	
(Ladrone Ids.) -				Middle Cove -	3 30		
Pelew Islands -		6		Goree Road -	4 0	8	
				Lennox Cove -	4 40	8	
				Nassau Bay -	4 0	6	
				Good Success Bay	4 3	6-8	
				Packsaddle Bay -	3 30	6	
				Orange Bay -	3 30	5	
				New-year Sound -	3 30		
				Adventure Cove -	3 10	4	
				March Harbour -	3 10	6	
				Doris Cove -	3 0	4	
				Stewart Harbour -	2 50	4	
				Townshend Harbour	2 30	5	

Place.	High Water, Full and Charge.	Rise.	
		Springs.	Neaps.
Harbour -	h. m.	ft.	ft.
Cove, Fury } nd - }	2 30 2 30	4 4	
st Bay -	0 30	6½	
rd Bay -	0 30	7½	
a Harbour -	12 0	6½	
Island -	2 30	5	
Harbour -	1 0	6	
Castlereagh -	2 50	4	
Glooucester -	1 30	5	
Inman -	2 0	4	
de Bay -	2 5	4	
: Islands -	2 0	5	
ation Harbour -	1 40	4	
o Ramirez } ands - }	4 0	6	
<i>Patagonia, West Coast.</i>			
gelists -	1 0	5	
Henry -	12 0	5	
Barbara -	12 28	4	
Ladeo River -	11 45	6	
San Domingo -	12 0	7	
Palena -	12 23	10	
e Bay -	1 45	11	
<i>Chonos Archipelago</i>			
Otway -	11 37	6	
Andres Bay -	0 45	5	
San Estevan -	0 15	5	
a Pink Bay -	0 45	5	
mar Road -	0 18	5	
Low -	0 40	7	
<i>Chiloe Archipelago.</i>			
so Island -	12 0	7	
so Bay -	12 0	6	
San Carlos, } wn - }	11 15	6	
San Carlos } Arenas - }	0 14	6	
" English } unk - }	0 4		
Imapu -	0 50	10	
cara Rock -	0 50	16	
Pedro Passage -	0 30	9	
dad Inlet -	0 48	16-20	
an Cove -	0 28		
an Island -	1 3	15½	
Island -	0 31	18	
eldon Harbour -	0 54	18	
ro -	0 11	18,	
ahue -	0 26		
gues Islands -	0 35		
avi Bluff -	0 57	20	
ro Cove -	0 55	20	
s Head -	0 29		

Place.	High Water, Full and Charge.	Rise.	
		Springs.	Neaps.
Compu Inlet -	h. m.	ft.	ft.
Cullin Island -	1 10	17	13½
Huapilinao Head -	1 25	15½	
Reconlavi Inlet -	0 44	14	
Puluqui Island -	1 5		
Calbuco Fort -	1 18 or 0 47	18	
" Beach -	1 15	16	
Abitao Island -	0 50	18	
Tres Cruces Point -	1 15	16	
Chacao Bay -	0 40	14	
" Narrows -	1 15	16	
<i>Chile.</i>			
Coyhuin River -	0 52	21	
Port Valdivia -	10 35	5	
Mocha Island -	10 30		
Leubu River -	10 30	5	
Santa Maria Island -	10 20	6	
Arauco Bay -	10 15		
Talcahuano -	10 14	5	
Maule River -	10 0		
Toro Point -	9 45		
Valparaiso -	9 32	5	
Juan Fernandez } Island - }	9 30	4	
Pichidanque Bay -	9 20	5	
Port Herradura -	9 8	5	
Coquimbo Bay -	9 8	5	
Port Huasco -	8 30	6	4
Copiapo -	8 30	5	
Port Flamenco -	9 10	5	
Lavata Cove -	9 20	5	
Grande Point -	9 45		
Paposo -	9 40	5	
<i>Bolivia.</i>			
ConstitucionCove, } Moreno - }	10 0	4	
Port Mexillones -	10 32	3	
Cobija Bay -	9 54	4	
Paquique or San } Francisco Point }	10 45		
<i>Peru.</i>			
Iquiqui Road -	8 45	5	
Lobo Point -	8 0		
Arica Road -	8 0	5	
Mollendo -	8 0	5	
Ylo Road -	8 15	6	
Islay -	8 53	7	
Quica River -	8 0	6	
Point Lomas -	8 19	5	
Atico Road -	8 53	5	
Port San Juan -	5 10	3	
" San Nicholas -	5 15	3	
YndependenciaBay -	4 50	4	



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>America, North West Coast.</i>							
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft</i>	<i>ft.</i>
ually, Puget } und }	6 0	18	15	Port Kuper -	1 40	13	10½
Shucartie -	1 0	13½		Portland Inlet, }	1 8	16	
ver Harbour -	1 15	15½		(Salmon Cove) }			
Western }	1 0	13½		Sitka -	0 34	5-7	
strance -		11		Behring Bay -	0 30	9	
α Bay -				Port Etches -	1 15	9½	
dahmoo Bay -				" Chalmers -	1 0	13½	
Drayton Har- }	2 0	12		" Chatham -	1 0	12	
ur) -				Ounalashka Island	7 30	7½	
er River (en- }	6 30	7-10		Cape Roahnoff -	7 30	15	
nance) -				Good-news Bay -	6 15	13½	
ard Inlet, }	6 0	16		Golovnin Bay -	6 23	3½	
. of Georgia -				Port Clarence -	4 25		
simo Harbour }	5 0	14		Chamisso Island -	4 42		
. of Georgia - }							

# T I M E

OF

## HIGH WATER ON FULL AND CHANGE DAYS

AT THE PLACES GIVEN IN THE PRECEDING PAGES;

ARRANGED ALPHABETICALLY;

*With the Rise of the Tide at Springs and Neaps.\**

(When a query, thus ?, is placed after the Time of High Water and the Rise, it indicates that what given are approximations.)

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Abaco, Bahamas - -	h. m. 8 0	ft. 3		Aggerminde, Jutland -	h. m. 4 9	ft. 2	
Abbey Head, England -	11 10	23	17½	Agnes, St., Scilly Isles -	4 30	16	
Abd-ul Kuri, Indian Ocean	8 30	6		Agoda Pnt., Hindoostan,	10 30	9	
Aberdeen, Scotland - -	1 0	12	10	W. Coast.			
Aberdovey, Wales - -	8 0	15		Agulhas Cape, Africa, S.	2 50	5	
Abervrach, France - -	4 14	22	16	Coast.			
Aberystwyth, Wales -	7 31	13½	10	Aix, Ile d', Charente R.,	3 20	17	
Abrolhos, Brazil -	4 48	6		France.			
Abtao I, Patagonia, W.C.	0 50	18		Akaroa Harb., New Zea-	3 24	8	
Abú-shehr, Persian Gulf	7 30	7		land.			
Acajutla, Central America	2 25	9		Akasi, Japan Sea -	6 36	6½?	
Acapulco, Mexico, W. Cst.	3 6	1½		Akyab, Aracan R., Bay	9 45	9	
Acheen Head, Sumatra -	8 45	8		of Bengal.			
Achillbeg, Ireland - -	5 14	10½	8	Al Bidá, Persian Gulf -	8 30?	6?	
Adams Port, (Sullivan	0 15	8		Alabat Harbour, Luzon -	10 0	9	
Bay) Yellow Sea.				Alan Island, Patagonia,	0 31	18	
(Mary Id.)	2 0	10		W. Coast.			
Yellow Sea.				Albany Id., Australia,	12 15	10	
Adelaide Port, Australia,	5 44	6		E. Coast.			
S. Coast.				Albemarle Id., Galapagos	2 0	6	
Aden, (Back Bay), Arabia,	9 30	8½		Port, Falkland	7 15	7	
S. E. Coast.				Islands.			
Adenara, Flores, Malay		8		Albert River, Australia,	7 30	10-13	
Archipelago.				N. Coast.			
Admiralty G., Australia,	12 0			Aldborough, England -	10 45	8?	
N.W. Coast.				Alderney, English Chan-	6 46	17	
Adolphus Id., Torres Strt.	12 15	10		Alexander Port, Africa,	3 0	5	
Adou Atoll, Maldives -	1 0	4		S.W. Coast.			
Adou Matte Atoll, Mal.	3 0	4		Algeciras, Spain -	1 49	4	
dives.				Algoa B., Africa, S. Cst.	4 0	4-5	
Adventure Cove, Tierra	3 10	4		Alligator Rvr. Australia,	8 40	19-20	
del Fuego.				N. Coast.			
Port, New	12 20	8	6	Alloa, Firth of Forth,	3 18	17½	
Zealand.				Scotland.			
Sound, Falk-	5 30	5½		Altona, Germany - -	5 19	7	
land Islands.				Amboyna, Moluccas -	0 33	7	
Agadir, or Santa Cruz,	12 45	9		Ameland Gat, Netherlands	9 0	7	
Africa.				- Hollum Rd., "	11 30	7	

\* By the Rise of the Tide is meant its vertical rise above the mean low-water level of Spring Tide.  
See Diagram, page iv.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ound, Nova Scotia	10 30	8	5	Appin Port, Scotland -	5 26	12½	8½
té Isles, (St. Joseph	5 0	8½		Appledore, England -	5 28	23	16½
Indian Ocean.				Aquin Bay, St. Domingo	irr.	2-3?	
h, Wales - -	10 30	18?	13?	Aracan R. (Bar), Bay of	9 45	9	6
(Inner Harbour),	12 0	16		Bengal, E. Coast.			
na, East Coast.				Aracati, Brazil - -	6 0	8	6
nam B., Lombock-	8 0	6		Araish El, Africa, N. Cst.	1 30	9-12	
rdam, Indian O. -	11 0	3		Arasaig, Scotland -	5 50	13½	10
gawein, Persian G.	11 40	6		Arauco Bay, Chile -	10 15		
Strait, G. of Tartary	11 40	5-6		Arbroath, Scotland -	1 35	14	11
man Ids., Port Corn-	10 0	8½		Arcachon, France -	4 37	11½	9¼
lis, Indian O.				Arcas Rks. G. of Mexico	noon	1½	
— Strt. Indian O.	10 24	9¼		Ardglass, Ireland -	11 0	16	12
ava Bay, Madagas-	3 30	7		Ardrihaig, Loch Fyne -	11 53	9	7½
.				Ardrossan, Scotland -	11 45	10	8
es, San B., Patagonia,	0 45	5		Arenas Pt., San Carlos,	0 14	6	
. Coast.				Patagonia, W. Coast.			
rews, St., Bay, G.	irr.	1-2		Argyle, Bay of Fundy -	9 27	12½	10½
Mexico.				Arica Road, Peru -	8 0	5	
guda, Virgin Islands	9 0	1½		Arichat, Nova Scotia -	8 10	5	4
iteum, Inyang, S.	6 35	4		Arkhangel, White Sea -	7 28	2½	
acific.				Arklow, Ireland -	8 45	4	3
oxa River, Africa,		13		Arnhem B., Australia, N.C.	8 0	6-8	
Coast.				Arroa, Malacca Strait -		10	
ra, Azores - -	12 32	4½		Arthur Port, Tasmania -	7 52	4	
— Bank, Hindoo-	10 30	9		Arundel, England -	12 25		
is, W. Coast.				— (Bar) - -	11 35		
— Pequena, Africa,	2 30	8		As Rocas, S. Atlantic -	5 15	10	
W. Coast.				Asaph St., B., Australia,	5 45	14	
a Pink B., Patagonia,	0 45	5		N. Coast.			
. Coast.				Ascension Id., S. Atlantic	5 30	2	
an Foot, England -	11 56	20	14	Askalg Port, Istay -	4 58	6¼	4
apolis, United States	4 38	1	1	Astor, Oregon -	0 42	7½	6
is, St. B., Cape Breton	8 34	6	4½	Atacames Bay, Ecuador	3 37	13	
isquam, United States	11 0	10½	9	Atchafalay Bay, G. of	irr.	2-2½	
is Bom Id., Africa	3 45	5		Mexico.			
osti Id., G. St. Law-				Athline, Loch Seaforth -	6 16	15	10
ice, East Cape -	1 0	5	3	Atico Road, Peru -	8 53	5	
Bear Bay -	1 10	5	3	Auckland Harb., New Zea-	7 5	11	9
West Point -	2 0	6	4	land, N. Island.			
onish Harb. R. St.	9 0	4	2	Augustine St., U. States	8 21	5	4
wrence.				— St., B., Mada-	4 30	13	
qua Id., Carribbean		2		gascar, W. Coast.			
.				Aux Cayes Bay, St.	irr.	2-3?	
agil Bay (Port	4 0	5		Domingo.			
oiseul), Madagascar.				Avatcha B., Kamchatka -	3 30	6½	4½
io Cape St., Cuba		1½		Avon Isles, Australia, E.C.	8 30	5	
io St. Port, Pata-	10 40	28		Avon River, Bigbury	5 47	16½	11½
ia, E. Coast.				Bay, England.			
— Ma-	12 0	7		Awasma (Inland Sea)	0 14	7	
lan Strait.				Japan.			
bus Id., G. St. Law-	10 30	5	3	Awanui R., New Zealand	7 44	7	
ce.				Axim, Africa, W. Coast.	4 30	4	
erp, Belgium - -	4 25	15		Aylen Bay, Yellow Sea	2 40		
Pulo, Sumatra, N.E.		5		Aymaun, Persian Gulf -	11 20	6	
ast.				Ayr, Scotland - -	11 50	8½	7½
Harb., New Zealand	10 0	12		— Point of, I. of Man	11 7	20?	16?
chicola B., Gulf of		2½-4		Bab-el-Mandeb, G. of Aden	12 0	7	
xico.				Bachelor River, Magellan	1 40	5	
etetat B., Gulf St.	11 10	5?	3?	Strait.			
wrence.							

From observations made in the month of September by W. Stanton, Master Commanding U.M. Surveying Brig Saracen.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Bacuit B., China Sea, E.C.	h. m. 10 0	ft. 6		Barnstable Bridge, Eng-land.	h. m. 6 28	ft. 10½	
Badas Id., Linga Bay, Sumatra.*	6 0 PM	12		Barquero (entrance), Spain, N. Coast.	3 0	15	
Badong B. (S. Cst.). Baly Bagroo River, Sherbro River, Africa.	11 0	9½	11	Barracouta Harb., G. of Tartary.	10 0	3½	
Bahia, Brazil - -	3 30	8		Barren Id., China Sea, E. Coast.	9 30	5½	
Bahrein, Persian Gulf -	5 30	7		Barren Ids., Madagascar	4 45	12	
Balabac Id., China Sea, E. Coast.	11 0	5		Barrow Harbour, Newfound-land.	7 10?	5?	
Balade Harb., New Caledonia.	6 30	4?		Barton Port, (Bubon Point), China Sea E.C.	10 55	6	
Balambangan Id., Borneo, N. Coast.	10 0	6-8		Bas, Ile de, France -	4 49	23	
Balasore R., B. of Bengal, W. Coast.	10 0	15		Básiduh, Persian Gulf -	12 0	10	
Balbriggan, Ireland -	10 40	11		Basque Port, Newfound-land.	8 55	5½	
Bald Head, United States	7 26	5	4½	Basrah (Bar), Persian Gulf.	12 0		
Ballinacourty, Dungarvan, Ireland.	5 12	12½	9½	— Town - -	6 0?	9?	
Ballinskellig Bay, Ireland	3 40	12	7½	Bassein R., Bay of Bengal.	10 0	9	
Ballycastle B., Ireland -	6 25	3	2	Batanes, Bashee Islands, China Sea, E. Coast.		4	
Ballycottin, Ireland -	4 54	12	9½	Batavia, Java - -	10 0	2	
Ballycrovane, Kenmare River, Ireland.	3 42	10½	7½	Batchian, Gilolo, Moluccas	1 0	6	
Ballynakill Bay, Ireland, W. Coast.	4 40	12½	9½	Bate (Gulf of Cutch), Hindoostan, W. Coast.	12 20	12	
Ballyness (Bar), Ireland	5 22	11½	8½	Bathurst, G. St. Lawrence	3 15	7	
Ballysadare (Quay), Ireland.	6 0	8½	5½	Bathy Netherlands -	3 15	15	
Ballyshannon (Bar) -	5 18	11½	8½	Batiscan, R. St. Lawrence	9 48	3½	
Ballyweel, Ireland -	5 23	12½	8	Batticalao River, Ceylon	5 0	2-3	
Balta, Scotland - -	9 45	6	4½	Bay of Harbours, Falk-land Islands.	6 0	5	
Baltimore, Ireland - -	4 23	10½	8½	Bay of Islands, (Motu Mea Islet,) New Zealand.	7 15	9	
— United States	6 33	1½	1½	Bay of Mercy, Banks Land		2	
Banana Ids., Africa, W.C.	8 15	9		Bayonne (Bar), France -	3 45	12	
Bancoot R., (entrance) Hindoostan, W. Coast.	2 0	12		Bazaruto Cape, Africa, E.C.	4 15	10	
Banda, Moluccas -	4 0	6?		Beachy Head, England -	11 20	20	
Bander Alúleh, G. of Aden	6 45	6		Bear Cape, Prince Edward Island.	9 0	6	
— Gori, Gulf of Aden	8 45			Bear Head, C. Breton Id.	8 30	4½	
— Shaab, Ind. Ocean	7 0	7		Beaubère Id., Gulf St. Lawrence.	6 30	6	
— Feikam, Arabia, S.E. Coast.	10 0	8½		Beaufort, United States -	7 26	3½	
Banff, Scotland - -	0 28	10½	8	Beaumaris, Wales -	10 32	21½	
Bantam, Java - -		5		Beaver Harb., America, N.W. Coast.	1 15	16½	
Bantry Harb., Ireland -	3 47	10	7½	— (W. entrance) -	1 0	13½	
Barataria Bay, Gulf of Mexico.	irr.	1½		— Nova Scotia -	7 40	6½	
Barbados, Caribbee Ids.	irr.	2		Bedeque Harbour, Prince Edward Island.	10 15	7	
Barbara l'ort, Patagonia, W. Coast.	12 28	6	4	Bedford Bay, Tierra del Fuego.	0 30	7½	
— I. Santa, California	8 0	3½		Behring Bay, America, N.W. Cst.	0 30	9	
Barbe St., Sumatra, N.E. Coast.	6 0	6		Belfast, Ireland - -	10 43	9½	
— Sta. Id., California	8 0	3½		Belgrano Port, La Plata	6 0	12	
Bardsey Id., Wales -	7 40	15		Bell Sound, Spitzbergen	8 56	3½	
Barfleur, France - -	8 51	17	13½	Belles Amour B., Labrador	9 0	4½	
Barmouth, Wales - -	7 41	17	13½	Belligam Bay, Ceylon -	2 20	2½	
Barnstable, United States	11 22	10	8½				
Barnstable Bar, England	5 30	19	14				

\* From observations made in the month of September by W. Stanton, Master Commanding H.M. Surveying Brig Saracen.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
aka Bay, Mada-	4 30	16		Black Ball Harb., Ireland	3 40	9½	7½
W. Cst.				— Rock, Bay of Fundy	11 29	36	31
re Pt., England	11 0	14	10½	Blacksod Bay (Quay), Ire-	4 47	10	8½
n, Sumatra -	6 0	3-5		land.			
e, Brasil -	3 0	5		Blair Harb., China Sea,	8 50	9	
, Africa, W. Cst.	2 30	5?		W. Cst.			
, Africa, S. Cst.	4 30	7		Blakeney, England -		9	
Castle, Cleddau	6 23	20	14½	— (Bar) "	6 30	15	
Wales.				Blanche Port, Streaky	1 0	5	
or Barburra	7 15	9		Bay, Australia, S. Coast.			
Aden) Africa,				Blankenberg, Belgium	12 48	13	11
				Blanco Cape, Africa, W. C.	11 46	6	
Guyana -	4 30	11?		Blas, San, Mexico, W. Cst.	9 41	6½	
Norway -	1 30	4		— La Plata -	2 0	12	10
Sound, Falkland	5 0	7		Blasket Islands, Ireland -	3 30	11½	8
Is: Ireland Id., N.	7 14	4		Blewfields, Mosquito Coast	1 50	2	
ic.				Bligh Sound, New Zea-	10 45	8	6
Loch Roag,	6 11	11	8	land.			
Id.				Block Id., United States	7 36	3½	2½
, I. of Harris,	6 11	13	9½	Bluff Cay, Bahamas -	7 0	4½	
Id.				Bluff Harb., New Zealand	1 18	8	6
Point, Banks	6 30	12		Blyth, England -	3 15	15	11
				— R., Southwold,	10 20	6½	4½
R., Gulf St.	2 0	12	7	England.			
nce				Bodega Port, California	11 17	4½	3½
Scotland -	2 18	15	11½	Bodkin Light, United	5 42	1½	1
en Harb., G. St.	11 32	5	3	States.			
nce.				Bojador Cape, Africa -	12 0	8?	
R. (entrance),	0 15	5		Bolt Head, England -	5 45	15?	11?
istan, W. Cst.				Bombay Dockyard, Hin-	11 40	12-17	
(Tooniang Id.)	8 0			doostan, W. Coast.			
E. Coast.				Bonacca Id., Bay of Hon-	9 0	1½	
Tsangchow Id.)	8 30			duras.			
E. Coast.				Bonanza, Spain -	2 0	12½	8
St. Lawrence	2 15	14	8½	Bonaw, Scotland -			
, B. of Bengal,	10 0	14	12	Bonne Esperance Harb.,	9 15	5	2½
				G. of St. Lawrence.			
England -	6 7	16		Bonny R. C., Africa, Wst.	5 0	9	
Islands, Arcas	10 10	11-14	9	Booby, Island, Australia,	4 30	8	
l, Africa, W. Cst.				N. Coast.			
— Bissao,	11 0	8		Bordeaux, France -	6 50	14	12½
W. Cst.				Borja B., Magellan Strait	1 50	6½	
Orango	10 0	11		Borkum (Road) Germany	10 30	8-10	
l, Africa, W. Cst.				Boscastle, England -	5 15	25	17½
ar), Spain -	3 0	13		Boston (Sluice), England	7 0	12	
own), " -	3 20	9		— Deep (Clay Hole) "		21½	
of Mexico -	irr.	2		— Hob Hole " -		17	
Sambawa -	Noon.	6		— (Charlestown Naval	11 27	11½	10
B. China Sea,	11 30	5		Yard) United States.			
				— Light, United States	11 12	11	9½
ance -	6 3	30	22½	Botany Bay, Australia, E.	8 15	7-8	
l., China Sea,	5 45	6		Cst.			
d, China Sea,	9 30	6		Boteler R., Madagascar-	4 30?	15?	
				Boucaut, France -	3 39	8½	6
Africa, S. Cst.	4 0	4-5	4½	Boughton Harb., Prince	8 40	5	2½
ight, United	7 59	8½		Edward Island.			
Point, Jutland	1 44	5		Boulogne, France -	11 25	25	19½
				Bourbon Id., Indian Ocean, see Reunion Id.			
				Bouro (Cajeli Bay) Mo-	1 0	6	
				luccas.			



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Ri
		Springs.	Neaps.			
	h. m.	ft.	ft.		h. m.	ft.
Bow Island, S. Pacific -	2 40	3		Bulama Island (Arcas Channel), Africa, W. Coast.	10 10	14
Bowen Port, Australia, E. Cst.	9 35	16		Bull Id., Newfoundland	7 22	3½
Bowling, R. Clyde, Scotland.	0 39	9		Bulls Id. Bay, United States	7 16	5½
Boyanna B., Madagascar, W. Cst.	4 30	15		Bulls Mouth (Achill Sound, N. entrance,) Ireland.	5 38	10½
Bradore Bay, Labrador -	8 45	4	2	Bulsaur R., Hindoostan, W. Cst.	1 45	18
Braha Harbour, Newfoundland.	7 0?	2-3?		Buluagan O'sta Ana Port, Filipinas.	12 0	5½
Bramble Cay, Torres Strt.	9 15	12		Buncrana, Ireland -	5 40	16
Brandy Pots, River St. Lawrence.	3 0	17	10	Buncassan, Scotland -	5 24	12
Brass River, Africa -	4 0	6		Burburra, <i>see</i> Berbereh.		
Brava, Africa, E. Cst. -	4 30	8		Burin Harbour, Newfoundland.	8 45	6½
Bray Head, Ireland -	10 45	12	9½	Burntisland, Firth of Forth, Scotland.	2 24	16½
Brazos River, G. of Mexico	irr.	1½		Burnt Isles, Kyles of Bute, Scotland.	11 50	10
Bréhat, France -	5 51	31	23½	Burong I., China Sea -	4 45	7
Brest, France -	3 47	19	13½	Burrard Inlet, Gulf of Georgia.	6 0	16
Bridgeport, United States	11 11	8	6½	Bushire, <i>see</i> Abú-shehr.		
Bridgewater (Bar) England	6 50	35	26½	Bussorah R. Bar, Persian Gulf.	12 0	
Bridlington, England -	4 39	16	12	Busuanga, Burias Island	12 30	6
Bridport, England -	6 5	11½	7½	Button Islands, Hudson Strait.	6 50	
Brielle, Netherlands -	3 0	5		Byron Bay, Australia, E. Coast.	9 45	6
Brighton, England -	11 15	19½	16	— Cape, Australia, E. Coast.	9 45	6
Bristol (King Road) England.	6 56	44	33	Cabita Bay, New Granada.	3 40	12
Britannia Bay, Sumbawa	1 0	11-12		Cacheo River, Africa, W. Coast.	7 45	8
British Sound, Madagascar, E. Cst.	4 0	9½		Cadiz, Spain -	1 45	9½
Broad Sound, Australia, E. Cst.	11 0	20-30		Caen, France -	10 57	
Broadhaven Har., Ireland.	5 0	10½	7½	Caermarthen (Bar) -	6 10	26
Broadway R. (entrance), China, E. Coast.	11 0	7½		Caernarvon, Wales -	9 33	13½
Broken Bay, Australia, E. Coast.	8 0	6-9		Caimites, St. Domingo -	8 0?	12
Broom Loch (Ullapool)	6 40	14½	10½	Cairnlough, Ireland -	10 51	5½
Broughty Ferry, Scotland	2 22	14½	11	Cajeli Bay, Bouro -	1 0	6
Brouwershaven, Netherlands.	2 15	10	8	Calais, France -	11 49	19½
Bruit River, Borneo -	3 0	11		Calbuco Beach, Patagonia, W. Coast.	1 15	16
Bruni R., China Sea, E. Coast.	11 0	12		Calcasieu Fort, Patagonia, W. Coast.	1 18	18
Brunsbüttel, Germany -	1 58	9		— River, Gulf of Mexico.	0 47	2½
Brunswick B., Australia, N.W. Cst.	12 0	24		Calcutta, Bengal -	2 30	
Brush, Yarmouth, England		5½	4½	Caldy Island, Bristol Channel.	6 0	24?
Bubon Point, Port Barton, China Sea, E. Coast.	10 55	6		Calebar R., Africa, W. Cst.	5 0	9
Buctouche River, G. St. Lawrence.	3 30?	4?	2½?	Caledonia Harbour, New Granada.	11 40	1½
Budehaven, England -	5 45	23	17	Calf Sound, Isle of Man-	11 17	16½
Buenaventura Port, Central America (Negrilla Reef).	4 0	13				
„ off the town -	6 0	13				
Buenos Ayres, S. America, E. Coast.	noon	irr.	irr.			
Buffalo R. (entrance), Africa, S. Cst.	3 45	4½				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Noaps.			Springs.	Noaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
oads, Hindoostan, East.	0 15	5		Carlisle Port, England -	12 10	20	14
ay, Peru -	5 47	4		Carlos, San, Port, Patagonia, W. Coast.	11 15	6	
Castle Pt.), Eng-	11 30	13	9½	— (Arenas Point)	0 14	6	
., R. Tamar, Eng-	6 6	12½	8½	Patagonia W. Coast.			
in, Babuyan, Is.	6 0	6		— (English Bank)	0 4		
ias Port, Spain -	3 0	15		Patagonia W. Coast.			
g, Banda Sea, Harb., Australia, Coast.	noon	6		Carlos, San, Port, Falkland Islands.	7 0	8	
on R., Africa, W.	4 0?	6		Carouge River, R. St. Lawrence.	7 15	16	11
ll Cape, New Zea-	6 0	8	6	Carrigaholt, Ireland -	4 44	14	10½
— Island South ic.	12 0	43?		Carsaig, Scotland -	5 28	10	7½
— Town, Gulf St. ence.	4 0	10	7	Cartagena, New Granada	11 0	1½	1
ilton, Scotland -	11 45	8½	6	Carteret, France -	6 25	31	22½
he, Yucatan -	1 45	2½	2	— Port, New Ireland.		6	
ello (Welchpool), Fundy.	11 21	23½	20	Cascumpeque H., Prince Edward Island.	5 40	3	2
, France -	6 20	37	27	Cashla Bay, Ireland -	4 33	16	12
Gut (Plaister), Nova Scotia.	9 10	4½	3	Casquets, English Channel	6 45	15½	
Har., C. Breton Id.	7 48	6½	4½	Castlereagh Cape, Tierra del Fuego.	2 50	4	
Cape, Africa -	10 0	10		Castletown, Bearhaven, Ireland.	4 14	9¾	7½
River (entrance), L.	10 0	8		— Isle of Man -	11 10	20	16
River } In Mar.	2 40	5½		Castletownsend, Ireland -	4 21	10¾	8
per Id.) } In May	1 40	5½		Castries B., G. of Tartary	10 30	6	
" } & June	2 40			Castro, Patagonia, W. Cst.	0 11	18	
(City) -	2 40			Casuarina Point, China Sea, E. Coast.	9 30	6¾	
ast Castle, Africa, East.	4 30	6		Catharina Sta. I., Brazil -	2 30	3	
ay Landing, U.S.	8 19	6	5	Cato Bank, Australia, E.C.	8 15	3½-5½	
River, Ecuador -	3 30	10		Catoche Cape, Yucatan -	9 30	1	
tte Harbour, G. of wrence.	2 40	6	3	Cattawade Bridge, Stour River, England.	1 8	4½	
Wales -	6 59	38	29	Cavalli Ids., New Zealand	8 0	7	
n, Wales -	7 1	12	9	Cavern Island, China Sea, E. Coast.	9 30	5½	
— Bay, Prince rd Island.	8 40	5	3½	Cawee Islands, Gulf St. Lawrence.	1 50	9	5
ig Bay, Australia, Coast.	11 45	30		Cay West, United States — N.W. Channel, U.S.	9 30	1½	1½
pu, Patagonia, East.	0 50	10		Cayenne, Guayana -	9 10	1½	1½
s Garayos Shoals, Ocean.	2 0	4		Cayeux, France -	3 45	6	
n, R. Tamar, nd.	5 47	14¾	10¾	Cedar Cays, United States	11 5	27½	21
Harbour, Nova L.	10 0	6	4	Cedeira, Spain, N. Coast	0 51	3½	2½
Point, Gulf St. nce.	3 0	6	4	Centre Id., (Foveaux St.) New Zealand.	3 0	15	
ord (Bar or Cran-Point), Ireland.	11 0	14	11	Ceram, Wahaay Harbour, Moluccas.	12 15	8	6
				Cerro Id., California -	6 0	3	
				Ceuta, Africa, N. Coast -	9 10	7-9	
				Chacachacara Id., Trinidad, Caribbean Sea.	2 6	3½	½
				Chacao Bay, Patagonia, W. Coast.	3 30	4	
				— Narrows, Patagonia, W. Coast.	0 40	14	
				Chalky Inlet, New Zealand.	1 15	16	
					11 5	8	6

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Chalmers Port, America, N. W. Coast.	1 0	13½		Chittagong (Bar), Bay of Bengal, E. Coast.	1 15	15	
Chamé Bay, New Gra- nada.	4 0	16		Choiseul Port, Madagascar, E. Coast.	4 0	5	
Chamisso Id., America, N. W. Coast.	4 42			Chosan Harb. or Tsau- liang-hai, Japan Sea.	7 45	7	
Champion Bay, Australia W. Coast.	9 10	1		Christchurch, England -	{ 9 0 11 30 }	{ 5 }	
Champlain R., St. Law- rence.	9 45	3	2	Christianstæd, Santa Cruz.	7 30	½	
Changchi Id., China, E.C.	9 30	17		Christmas Island, Indian Ocean.	10 0		
Changues Ids., Patagonia, W. Coast.	0 35			Christmas Harbour, Ker- guelen Id.	2 0	2	
Chapu Road, Hang-chu Bay, China, E. Coast.	12 0	25		Chuen-pee Point, Canton River.	2 0	7½	
Charles Cape, United States.	7 45	5		Chusan Archipelago, (Vernon Channel,) China, E. Coast.	9 40	14	
Charles Id., Galapagos -	2 10	6		— Tinghae, China, E. Coast.	11 0	12	
Charleston, United States	7 26	6	5	Circular Head, Tasmania	12 0	9	
Charlottetown, Prince Edward Island.	10 45	9½	7	Clam Point, B. of Fundy	8 27	8½	
Charlowka R., Lapland	8 8	12		Clara Sta., I., Ecuador -	4 0	11	
Chateau Bay, Labrador -	7 35	3½	1	Clare I., Ireland -	4 38	12½	
Chatham, England -	1 2	17½	14	Clarence Port, America, N.W. Coast.	4 25		
— Id., Galapagos	2 23	6½		Clarence Harbour, Long Island, Bahamas.	8 30	4	
— Port, America, N. W. Coast.	1 0	12		Clarke Harbour, Bay of Fundy.	8 40	9½	
Chatte Cape, United States	12 0	13	8	Clear, Cape, Ireland -	4 0	9	
Chanan Bay, China, E. Coast.	11 0	6½		Clearwater Point, Gulf St. Lawrence.	11 30	5	
Chausey, Isles de, France	6 9	35	26	Cleveland Bay, Aus- tralia, E. Coast.	7 30	10	
Cheduba, Bay of Bengal- Chee-fow Harb., Yellow Sea, see Chifu.	11 30	8		Cley, England, N.E. Cst.		5½	
Chentabun River, China Sea, W. Coast.	10 0	5½		Cliffden Bay, Ireland, W. Coast.	4 30	13½	
Chepo River, New Gra- nada.	3 40	16		Clinch Fort, Fernandina, United States -	7 53	6½	
Chepstow, England -	7 30	38	28½	Clonakilty, Bay, Ireland	4 30	11	
Cherbaniani Reef, Lacca- dives, Indian Ocean.	10 0	7	4	Coacocho Bay, G. of St. Lawrence.	10 30	5	
Cherbourg, France -	7 49	17	12½	Cobija Bay, Bolivia -	9 54	4	
Chesilton, England -	6 13	10½	7	Cocagne River, G. St. Lawrence.	7 30?	4?	
Chester, England -	10 30	26		Cochin Harb. and Road, Hindoostan, W. Coast.	1 0	3½	
Chester River (Rockhall Creek), United States.	5 23	2½	1	Cockburn Port, Africa, E. Coast.	4 15	12	
Chesterfield Islet, Aus- tralia, E. Coast.	8 30	5		Cockburn Sound, Aus- tralia, W. Coast.	9 0	1-1½	
Chetican, C. Breton Id. -	8 15	3½		Cockenzie, Firth of Forth, Scotland.	2 16	15½	
Chichester, England -	11 30			Cod Cape, United States	11 30	13	
Chifu, Yellow Sea -	10 0	8	6½	Codroy Island, New- foundland.	9 15	6	
Chimmo Bay, China, E. Coast.	10 20	16		Colarado River, La Plata	4 0	9	
Chimney Id., Rees Pass, China, E. Coast.	11 30	12		Colarados, R. La Plata -	3 40	11	
Chincheu Harb., China, E. Coast.	12 25	17					
Chin-hae, Yung R., China, E. Coast.	11 20	12½					
Chipiona, Spain -	1 34	12½	8				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs	Neaps.			Springs	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Spring Inlet, United States.	7 32	5½	4¼	Cranford Bay, Mulroy Bay, Ireland.	8 3	4	
ine, Ireland -	6 24	6½	4	Crapaud, Prince Edward Island.	10 0	8	6
Bay, Australia, r. Coast.	11 45	36		Crimon Ids., Java Sea -	8 0	6	5
Point, Colne River, land.	12 0	14	10	Crinan, Scotland -	4 49	6-8	4-5
billia Cay, Pearl s, Caribbean Sea.	2 0	2		Croc Harbour, Newfoundland.	6 30?	4?	
bo, Ceylon -	1 0	2		Cromarty, Scotland -	11 56	14	11
bia River, (entr.)	0 15	7½		Cromer, England -	7 0	14½	11
erica, N.W. Coast.				Crow Harb., Nova Scotia	8 0	6½	4½
o Islands, (Jo-	3 30	8½		Crooked Id., Bahamas -	7 0	2½	
o I.), Indian Ocean.				Crookhaven, Ireland -	4 9	9½	8
o Islands, (May-L.), Indian Ocean.	4 10	11½		Cucao Bay, Patagonia, W. Coast.	12 0	6	
nee River, Africa, Coast.	10 0	15	11½	Cuckolds Point, River Thames, England.	1 45	19?	15?
Inlet, Patagonia, Coast.	1 10	17	13¾	Culdaff Bay, Ireland, W. Coast.	5 53	8¾	6
neau, France -	3 12	13	9½	Culebra or Passage Id., Caribbean Sea.	9 0	1	
re, Cochín China -	3 0	4		Cullin Id., Patagonia, W. Coast.		20	
River, Africa -	4 30	6		Culpepper Id., Galapagos	?	?	
on Bay, Persian G.	7 45	9½		Cumberland Basin, (Sackville) Bay of Fundy.	11 55	45½	38
Spain -	1 18	11¾	7½	Cupehi Point, China, E. C.	8 0		
st Road, France -	3 46	21	15	Cupica Bay, New Granada.	3 30	13	
ncion Cove, Bolivia	10 0	4		Curieuse, Seychelles, Indian Ocean.	5 10	7	
y Cape, Australia, Coast.	11 0	18		Curtis Port, Australia, E. Coast.	9 40	10-12	
arb. Newfoundland	7 25			Cuttyhunk, United States	7 40	4½	3½
Port, New	3 50	7½	5½	Cutwell Harbour, Newfoundland.	7 0?	2-4?	
nd.				Cuxhaven, Germany -	1 8	10	
o, Chile -	8 30	5		Cuyler Harb., California	9 25	5	4
Road, England -	3 0	14½	11	Daggs Sound, New Zealand.	11 30	8	6
ibo Bay, Chile -	9 8	5		Dahouet, France -	6 5	32	23½
an Lthse., France	3 37	13¾	10½	Dalawan Bay, China Sea, E. Coast.	11 0	5	
rn River, Guayana	5 10	8½	6	Dalcachue, Patagonia, W. Coast.	0 26		
Bay, Bay of	9 10	4-5	3	Dalhousie Harb., G. St. Lawrence.	3 10	9	
al, W. Coast.				Dalkey Island, Ireland -	10 45	13	11
R. (Bar), Bay	9 0	5		Dalrymple B., Madagascar W. Coast.	5 0	15	
ngal, W. Coast.				— Prt., Tasmania	12 5	10	7
Bay (Elobey	5 0	7		Damaun Bar, Hindostan, W. Coast.	1 30	17	
, Africa, W. Cst.				Dampier Strait, Moluccas		11	
(Penrose Quay),	4 58	12¾	10	Danno R., Hindostan, W. Coast.	1 30	17	
id.				Darnley Id., Torres Strait	9 30	12	
Is., B. of Honduras	1 45	2		Dartmouth, England -	6 16	14	10
Inlet, S. Australia	11 40	8		Darwin H., Choiseul Id., Falkland Islands.	6 30	5½	
Il, Cape, England	4 35	18?	13?				
a, Spain -	3 0	15					
Id. (Prairie Bay),	4 25	17	10				
Lawrence.							
Isles, France -	9 7	20	15½				
escherry, Ireland	4 36	10¾	8¾				
sk, England -	4 35	14½	11½				
(West), England	{ 10 45 } { 11 45 }	{ 12½ } { 12½ }	{ 9½ } { 9½ }				
st, Patagonia, E.C.	9 30	40					
l River, Chile -	0 52	21					
l, B. of Honduras	8 30	1½					
sland, River St.	5 24	17	13				
ence.							

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Darwin Port, Australia, N. Coast.	h. m. 5 30	ft. 17-24	ft.	Donaghadee, Ireland -	h. m. 11 13	ft. 11½	ft. 9
Dauphin Fort, Madagascar	4 30	7		Donegal Harb., Ireland -	5 18	11½	8½
De Roompot, North Sea	12 30	12	8	Doris Cove, Tierra del Fuego.	3 0	4	
Deal, England -	11 15	16	12½	Dornock Road, Scotland	11 47	11	
Deep Point, Durian Strait	5 0	10		Douglas, Isle of Man -	11 12	20½	16
Deer Sound, Orkneys -	10 30	10	7½	— Road, Bahamas -	8 30	4	2½
Delagoa Bay (Port Melville), Africa, S. Coast.	4 30	15		Dover, England -	11 12	18½	15
(Portuguese Factory), Africa, S. Coast.	5 20	12		Downham Reach, Orwell, England.	12 27	12	
— Shefeen Id., Africa, S. Coast.	4 40	12		Dragons Mouth, Caribbean Sea.	3 0	4	
Delaware (Breakwater), United States.	8 0	4½	3½	Drayton Harb., St. Juan de Fuca Strait.	2 0	12	
Delftzyt, Germany -	11 15	8-10		Drogheda (Bar), Ireland	11 0	11½	9
Delgado C., Africa, E. C.	4 0	16	11½	Duart, Isle of Mull -	5 0	12	10
Delhi River, Sumatra -	4 0	8		Dublin (Bar), Ireland -	11 12	12-14	9-1
Demerara R., Guayana -	4 45	9	6	Dumbarton, Scotland -	0 20	9	
Denial Bay, Australia, S. Coast.	12 15	6		Dunbar, Scotland -	2 8	14½	11
Denison Port, Australia, E. Coast.	9 30	6		— Hindoostan, W. Coast.	10 10	8	
Desire Port, Patagonia, E. Coast.	12 10	18½		Dunbeacon, Ireland -	3 51	10½	7
Devonport Dockyard, England.	5 43	15½	11½	Duncansby Ness, Scotland.	10 14	10	7
Dewghur Harbour, Hindoostan, W. Coast.	11 25	9		Dundalk, Ireland -	10 56	13½	11
Diamond Island, Bay of Bengal.	10 30	8		Dundee, Scotland -	2 32	14½	11
— Point, Malacca Strait.	12 0	9½		Dungeness, England -	10 45	21½	19
Diego, San, Bay, California.	9 38	5	3½	Dunk Island, Australia, E. Coast.	9 28	6-10	
Diego, San, Cape, Tierra del Fuego.	4 30	10		Dunkerque, France -	12 8	16½	13
— Garcia Island, Indian Ocean.	1 30	6		Dunkerron, Kenmare R., Ireland.	3 45	10½	8
— Ramirez Ids., Tierra del Fuego.	4 0	6		Dunmanus Harb., Ireland	3 57	9½	7
Dielette, France -	6 40	27	20½	Dunmore, Ireland -	5 27	12½	9
Dieppe, France -	11 6	27	20½	Durnford Port, Africa, E. Coast.	4 45	12	
Digby Gut, B. of Fundy	11 0	27½	23	Dusky Bay, New Zealand	11 15	10	8
Dingle, Ireland -	3 51	10½	7½	Dvina (Bar), White Sea		3½	
Discovery Port, America, N.W. Coast.	2 30	7		Dyer Id., Africa, S. Cst.	2 50	5	
Dislocation Harb., Tierra del Fuego.	1 40	4		Easdale Sound, Scotland	5 10	10-12	
Diu Island, Hindoostan, W. Coast.	2 0	6		Easter Id., South Pacific	2 0		
Dives, France -	9 39	21	16	East Cape, New Zealand	8 55	7	
Divy Pt., Bay of Bengal		5		— Point, Prince Edward Island.	8 30	3½	1
Doboy Lighthouse, U. S.	7 33	7½	7	Ecerehous, France -	6 32	31	21
Dodandowe Bay, Ceylon	1 50	1½		Eddystone Pt., Australia, E. Coast.	9 39	7	
Dodo River, Bight of Benin.	4 17	5		Eden Harbour, Patagonia, W. Coast.	12 30	5	
Domingo, San, Port, Patagonia, W. Coast.	12 0	7		Edgar Port, Falkland Is.	7 15	6	
				Edgartown, United States	12 16	2½	
				Edina, Africa, W. Coast	5 50	4	
				Edmonstone, Id., Sherbro River Africa.			
				Egg Id. Lt., United States	9 4	7	
				— G. St. Lawrence	2 0	11	
				Egmont Bay, Prince Edward Island.	3 0	4	
				— Port, Falkland Islands.	7 30	11	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ord, Faeroe Ids.	11 0	9½	7½	Famine Port, Magellan Strait.	12 0	6	
trance, Germany	12 0	11		Fane Id., Plumper Sound, Oregon.	irr.	12	
sta., Port, Pata-	4 0	17		Fannings Id., S. Pacific		4	
E. Coast.				Fanny Hole, Mulroy Bay, Ireland.	6 17	9½	8
Bay, Ecuador	1 18	8		Fansiak Channel, Canton R., China, E. Coast	1 0	7½	5
h Bay, Africa,		5-6		Farallon, South, California	10 37	4½	3½
Coast.				Fareham (close to the Upper Quay), England.	11 48	11½	8½
ort, Islay	5 0	5	4	— Bridge, Eng-	11 51	7½	4½
ods Anchorage,	9 54	13	10½	land.			
of Fundy.				Farewell, Cape, New Zealand.	9 20	14	10
ort, Australia, S.C.		5-6		Fatsizio, Japan Sea	6 0	5	
Germany	12 0			Fayal, Azores, Atlantic Ocean.	11 45	4	
ver, (outer buoy),	10 0	8-10		Fear, Cape, River, United States.	7 19	5½	4½
any.				Fécamp, France	10 44	23½	18
ter Rock, Yellow	10 30	10		Fenit, Tralee Bay, Ireland	4 3	12½	9½
				Feolin Ferry, Jura	4 41	6½	4½
our R., Australia,	8 0	5-10		Fernandina, Clinch Fort, United States.	7 53	6½	6½
ast.				Fernando Noronha Island, S. Atlantic.	4 0	6	
— Strait, Aus-	1 0	9½		Fernando Po, Bight of Biafra.	4 0	7	
N. Coast.				Ferro, Canary Ids.	12 30½	9?	
io Harbour, Japan	5 30	6		Ferrol, Spain	3 0	15	
Bank, San Carlos,	0 4			Filey Bay, England	4 20	16	12½
gonia, W. Coast.				Finisterre, Cape, Spain	3 0		
Harbour, Antigua		2		Fish Hd., G. Manan, Bay of Fundy.	11 16	22½	18½
R., Delagoa Bay,	7 30	5		Fishguard, Wales	6 56	11½	8½
za, S. Coast.				Fitz-Roy Id., Australia, E. Coast.	9 15	7-12	
Bay, Japan Sea		4		Fitzroy Port, Falkland I.	4 45	6	
Bay, (Palawan)	10 10	6½		Flamand Bay, St. Domingo	irr.	2-3?	
a Sea, E. Coast.				Flamborough Hd., England	4 30	16	12
Bay, Barrow Strt.	12 6	8		Flamenco Port, Chile	9 10	5	
River, Bigbury	5 40	16½	11½	Flatholm Ids., Bristol Channel.	6 54	37?	28?
England.				Fleetwood Port, England	11 12	26½	19½
France	5 59	33½	24½	— Wyre Light	11 11	27	20½
m or Futuna, S.	7 24	4		Flesh Bay, or Bay St. Bras, Africa, S. Coast.	3 30?	6?	
fic.				Fleur-de lis Harb., Newfoundland.	7 0?	2-4?	
enac, Pt., Gulf St.	4 10	4	2½	Flinders Group, Australia, E. Coast.	9 15	8-12	
rence.				Florida Cape, United States.	8 34	1½	1½
u Santo, C., Ma-	8 30	36-42		Flushing, Belgium	1 20	15	
m Strait.				Fog Ids., Hang-chu B., China, E. Coast.	11 45	17	
nalt, St. Juan de	irr.	7-10	5-8	Fogo Id., Newfoundland	7 20	4	
a Strait.*				Folkstone, England	11 7	20	16½
ton Port, Australia,	3 24	13					
Coast.							
m, San, Port, Pata-	0 15	5					
ia, W. Coast.							
s Port, America,	1 15	9½					
W. Coast.							
elists, Patagonia,	1 0	5					
Coast.							
uth, England	6 21	12½	8½				
a, Bahamas	7 20	2½					
outh, Scotland	2 15	15?	11?				
Port, Australia S. C.	10 30	6					
ale, Shetlands	11 0	5	3½				
Port, Australia, S. C.		4					
nd Sound (N. en-	6 45						
ce), Falkland Ids.							
— (S. entrance)	7 0						
uth, England	4 57	16	12				
Point, Bay of Bengal,	8 0	8					
Coast.							

\* May to October from Midnight to 3 am. November to April from Noon to 3 pm.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Folly Point, Petiteoudiac River, B. of Fundy.	h. m. 11 49	ft. 45	ft. 38	Gambia R., Africa, W.C.	h. m. 8 10	ft. 6-9	ft.
Fongwhang Group (Bullock Harb.) China W.C.	8 30	17		Gambier Ids., Australia, S. Coast.	1 50	3	
Forçados River, Bight of Benin.	4 22	5		Garroch Head - -	11 49	10	
Forecarraeh R., Africa, W.C.	7 40	11		Gaspé Basin, Gulf St. Lawrence.	2 40	5	3
Formby Point, England -	10 35	28		Gay Head, United States	7 37	7	
Formosa Mt., Malacca Strt.	8 0	11	8½	Geby, Fohou Id., Gilolo Passage, Moluccas.		5	
Fort Dauphin, St. Domingo	7 0	5½	3½	Geelong Harbour, Australia, S. Coast.	2 50	2½	
Fortune Bay, Patagonia, W. Coast.	0 50	7		George Cape, Nova Scotia	9 15	4	2
Foulness, Crouch River, England.	12 5	14½	10½	George d'Elmina, St. Africa, W. Coast.	4 30	6	
Fowey, England - -	5 14	15	11½	Port, B. of Fundy	11 17	32	23
Fowlers B., Australia, S.C.	10 30	6		St., Basin, Australia, N. W. Coast.	12 15	25	
Fox Bay, Falkland Ids. -	7 0	6		Shoals, United States.	10 30	7	
Foyle Lough (Warrenpoint), Ireland.	6 20	6½	5	Georges, St., Sound, G. of Mexico, Mid entrance.	1 31	1½	11
Foynes Island, Ireland -	5 35	15½	12	West entrance	irr.	2½-4	
France, Port de, New Caledonia.	8 25	4		Georgetown, United States	8 40	4½	3½
Francis, St., Bay, Tierra del Fuego.	4 0			South Island, United States.	7 56	4½	3½
Francisco, San (North Beach), California.	12 6	4½	3½	Geriah Harbour, Hindoostan, W. Coast.	2 40	9	
Fraser River (entrance), Columbia.	6 30	7-10		Germain St., France -	6 20	34	25
Fraserburgh, Scotland -	0 40	11	8½	Ghubbet Ne, Socotra, Indian Ocean.	7 0	7	
Frechette Id., River St. Lawrence.	8 0	14	9	Hashish, Arabia, S.E. Coast.	10 0	10	
Frederick Reef, Australia, E. Coast.	8 0	6		Gibraltar, Spain - -	2 20	3½	
Frederickshaab, Greenland.	6 3	12½	9½	Gigha Sound, Scotland -	2 22	4	2
Friederichstadt, Denmark	2 37	9		Gijon Bay, Spain, N. Cat.	3 15	15	
Frio Porto, Brazil -	2 40	4½		Gilmorris Id., Africa, W. Coast.	6 0	11	
Froward Cape, Magellan Strait.	1 0			Gizree Bunder, Indus, Hindoostan, W. Coast.	9 50	7	
Fugloe Fiord, Faroe Ids.	11 15	6½	4½	Glasgow, Scotland - -	1 25	9	1
Funchal Bay, Madeira -	12 48	7		Port, Scotland -	0 18	9	
Funk Id., Newfoundland	7 0?	2-3?		Glenan Iles, France -	3 12	13	10
Fury Cove, Patagonia, W.C.	1 15			Glennie Ids., Bass Strait	12 20		
Harbour, Tierra del Fuego.	2 30	4		Gloucester Cape, Tierra del Fuego.	1 30	5	
Fury Id., Tierra del Fuego	2 30	4		Harbour, United States.	11 4	10½	1
Fury and Hecla Strait, Arctic Regions.	7 0	8		Gluckstadt, Germany -	3 9	10	
Gaboon R., Africa, W.C.	5 30	3		Goa, Hindoostan, W.C. -	11 30	6	
Galang Bay, Hainan Id., China Sea.		4-5		Godbout River, Gulf St. Lawrence.	1 52	11	
Gallant Port, Magellan Strait.	9 0	5½		Goeree (West Gat) -	1 45	7	
Galle, Pointe de, Ceylon, S. Coast.	2 0	2		Gollonsir Socotra, Ind. Ocean.	7 20	8	
Gallegos Port, Patagonia, E. Coast.	8 50	46		Golovnin Bay, America, N. W. Coast.	6 23	3½	
Gallinas R., Africa, W. C.	6 45	4		Gomera, Canary Ids. -	12 45?	9?	
Galloway (Mull of) -	11 15	15?	12?	Gometra, Loch Tuadh, I. of Mull.	5 29	11½	
Galway, Ireland - -	4 35	14½	11	Gonaives Bay, St. Domingo	8 0	1	
Galveston, G. of Mexico		1½	4				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Bay, Patagonia, W. st.	0 30	7		Grenadines, Caribbee Ids.	3 0	1½	
Hope, Cape of na, E. Coast.	9 0			Grey Port, Swan River, Australia, W. Coast.	9 0	1-1½	
News B., America, W. Coast.	6 15	13½		Greytown, Mosquito Cst.	9 0	1½	
Success Bay, Tierra Fuego.	4 3	6-8		Gribanika Pt. White Sea	4 50	3	
ya Creek (entrance), doostan, W. Coast.	11 0	9		Griffith I., Barrow Strait	12 15	3½	2½
Cove, Newfound-land.	7 0?	2-3?		Griguet Bays, Newfound-land.	7 0?	2-3?	
Sound, Virgin Ids.	8 30	1½		Grimsby, England	5 36	19½	15
Port, New Zealand	9 0	8	6	Grindstone Island, Bay of Fundy.	11 47	41	34½
Road, Tierra del Fogo.	4 0	8		Grisnez Cape, France	11 27	21½	16½
urn Ids., Australia, Coast.	6 0			Gronidine, R. St. Lawrence	9 0	9	6
l Island, Australia, Coast.	6 45	6		Guambacho Bay, Peru	6 30	2	
y, France	7 6	22	17½	Guarmey Bay, Peru	6 10	2	
as, Cape, Harbour, y of Honduras.	10 30	2		Guatuelco, Mexico, W. C.	1 30	5	
d Cestos, Africa, Coast.	5 20	4		Guayaquil, Ecuador	7 0	11	
- Harb., Gd. Manan, y of Fundy.	11 7	21	17½	Guaymas, Mexico, W. C.	8 0	4	
- Lahou, Africa, Coast.	4 20	4		Guernsey, (St. Peter Port,) English Channel.	6 37	26	18½
d Passage, B. of ndy.	10 43	20¾	17	Guia Narrows, Patagonia, W. Coast.	2 10		
d Port, Mauritius	1 0	1½		Guinchos Kay, Bahamas	7 40	3	
- Rustico, Prince ward Island.	6 40	4	2	Gun Cay, Bahamas	8 30	3	
de-digue, Madame I., pe Breton Id.	7 55	6½	4½	Gundavee R. (entrance), Hindoostan, W. Coast.	2 0	19	
de Point, Chile	9 45			Gunfleet Sand, England - Gutzlaff Id., China, E. C.	11 40	12	8
ton Pier, Scotland	2 20	16	12½	Gutzlaff Id., China, E. C.	11 30	15	
ville, France	6 13	37	27½	Guysborough, Nova Scotia.	8 20	6½	4½
elines, France	12 0	19	15	Gweedore (Bunbeg), Ire-land.	5 32	11	8
esend, England	1 10	17½	14	Haarlem, Netherlands	9 0		
t Barrier, Id. (Nagle ve), New Zealand.	6 25	10	7	Habitable Id., Lapland	7 9	9	
t Barrier Reef, Aus- lia, E. Coast.	8 48	7		Habitants Harb., C. Bre- ton, Id.	8 20	6½	4½
t Fish Bay, Africa, . Coast.	2 30	5-6?		Haimun Bay, China, E. Coast.	9 0		
t St. Lawrence rb., Newfoundland.	8 30	7	4	Haïti Cape, St. Domingo	6 0	3	
man Bay, Ireland	4 39	15½	11½	Hai-yun tau, (Thornton Haven), Yellow Sea.	9 0	12	
n Island, River, St. wrence.	2 45	16	9½	Hakluyt Head, Nova Zembla.	1 30	4	
castle Point, Ire- d.	11 2	14	11½	Hakodadi Harb., Yezo Island, Japan.	5 0	3	
ock, Scotland	12 8	9¾	8½	Halifax, Nova Scotia	7 49	6	5
rich, England	1 43	19	15	Halt Bay, Patagonia, W. Coast.	0 30	8	
ory Bay, Magellan ait.	9 45	23		Hamburg, Germany	5 29	6½	
da (St. George rb.), Caribbee Ids.	2 40	1½	¾	Hamilton Port (Korea), Yellow Sea.	8 30	11	
				Hammerfest, Norway	1 10	9	
				Hammond Knoll, Eng- land, E. Coast.	7 40		
				Hang-chu Bay (Sesham Ids.), China, E. Coast.	11 45	14	
				— (Fog Ids.)	11 45	17	
				— (Chapoo Rd.)	12 0	25	
				— off Can-pu		32	
				Hanover Sound, Bahamas	8 15	4	3



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Harbour of Mercy, Magellan Strait.	h. m. 1 22	ft. 4	ft.	Hillsborough Bay, Prince Edward Id.	h. m. 10 45	ft. 9½	
Harbour Grace, Newfoundland.	7 30?	7?		Island (New Port), Bonin Islands.	11 32	3½	
Harbour Id., Nova Scotia	7 40	6½	4½	Hillswick Firth, Shetland	9 45	6½	
Hardy Port, New Zealand	9 55	8	6	Hilton Head, United States	7 19	7½	
Harrington Port, England	11 5	26	19	Hirtshals, Jutland	4 28	1	
Hartlepool, England	3 28	15	11½	Hobarton, Tasmania	8 0	4	
Harwich, England	12 6	11½	9½	Hoe-e-tow Bay, China, E. Coast.	12 15	16	
Hastings, England	10 53	24	17½	Hokianga R. (entrance), New Zealand.	9 45	10	
Harbour, Bay of Bengal, E. Coast.	10 40	13½		Hokianga R. (Kokohn) New Zealand.	10 15	10	
Hatteras Inlet, United S.	7 4	2½	2	Hollesley, England	11 30	8?	
Haute Isle, Bay of Fundy	11 21	33	28½	Holmes Hole, United States.	11 43	1½	
Havana, Cuba		3		Holsteinborg, Greenland	6 30	10	
Haverfordwest, Wales	6 42	7½	2½	Holy Island, England	2 30	15	
Håvre, France	9 51	22	18	Holyhead, Wales	10 11	16	
Hawke B., New Zealand	7 50	3		Hon-cohe Bay, China Sea, W. Coast.	11 30	5	
Héaux Lights, France	5 45	31	23½	Hondenklip Bay, Africa, S.W. Coast.	2 30	5½	
Heawandou Pholo Atoll, Maldives.	9 30	5		Honfleur, France	9 29	23½	
Heda Bay, Japan Sea		5½		Honghai B., China, E. C.	10 0	6½	
Helena St., Bay, Africa, W. Coast.	2 30			Honoruru, Sandwich Ids.	4 0	2	
Id., S. Atlantic	3 11	3		Hooetow B. China, E. Cst.	12 15	16	
St. Sound, U. S.	7 8	7½	6	Hongkong, China, E. C.	10 15	4½	
Helgoland, German Ocean	11 33	9½	7	Hoogly R., (W. entrance), Bay of Bengal, W. C.	10 0	10½	
Helier, St., Jersey, English Channel.	6 25	30½	21½	Hope Harb., Falkland Ids.	8 10	7	
Hell Gate Approaches, United States.				Horn Cape, Tierra del Fuego.	4 40	9	
Long Id., (Blackwells Dock).	9 59	6	5½	Horn or Blaavand Point, Jutland.	1 44	5	
N. of Astoria	9 48	6½	5½	Horton Bluff, B. of Fundy	12 30	48	
Ferry.				Hougue La, France	8 42	18½	
Pot Cove, (S.E. part).	10 48	8½	6½	Hourdel, France	11 26	27½	
Wards Id., (Paupers Dock).	10 9	6½	5	Hout B., Africa, W. Cst.	2 20	5	
Hellevoetsluis, Netherlands.	2 30	8	6	Houtman Rocks, Australia, N.W. Coast.	11 30	2½	
Henlopen Cape, United States.	8 0	4½		Howden, R. Tyne, England.		12	
Henry Cape, United States	7 40	4		Howe, West Cape, Australia, S. Coast.	9 0	6	
Henry Port, Patagonia, W. Coast.	12 0	5		Howth Harbour, Ireland	11 9	13	
Heron Islet, Capricorn Group, Australia, E. C.	9 0	10		Huacho Bay, Peru	4 45	3	
Herradura Port, Chile	9 8	5		Huafo Islands Patagonia, W. Coast.	12 0	7	
Nicoya Gulf	3 9	10		Huapilinao Hd., Patagonia, W. Coast.	1 25	15½	
Hewett Bay, Tierra del Fuego.	0 30	6½		Huasco Port, Chile	8 30	6	
Heybridge, Blackwater, River, England.	12 20	12	8	Huila Inlet, Patagonia, W. Coast.	0 48	16-20	
Hie-chechin Bay, China, E. Coast.	7 0			Hukkar R. (entrance), Hindoostan, W. Coast.	10 30	11	
Hicks Bay, New Zealand	9 0	7		Hull, England	6 29	20½	
Hierling, Jutland	2 45	5		Bridge, Crouch R., England.	12 25	16	
Higbee, Cape May, United States.	8 33	6½	5½				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
B., Yellow Sea	2 30	8		James Id., W. end, Gal-	3 10	5	
Bay, California	12 2	5½	4½	apagos.			
L. Bass Strait -	11 30	8		— R. (City Point) U.S.	2 11	3	2½
ort, Australia, E.	9 45	6-7		Jask Cape, Persian Gulf	6 0	6	
				Jebogue, Bay of Fundy -	10 4	15	11½
umber), England {	10 0	7½	6	Jedore, Nova Scotia -	7 45	6½	4½
Denmark -	12 0			Jekatarina Ids., Lapland	6 23	10	
United States -	2 36	9		Jerba, Mediterranean -	3 10	7	5
., Africa, W. C.	12 22	4	3	Jericoacoara, Brazil -	11 30	12	
e, England -	1 0	6	4	Jersey (St. Helier), English	6 25	30½	21½
de, Brazil -	5 42	27½	21½	Channel.			
td', Africa, W.	12 30	5	4	— (Rosel) -	6 15	30	21½
	3 0	8-10		Jervis Bay, Australia, E.	6 20	6-9	
				Coast.			
t, Filipinas -	12 0	5½		Jezirat Arabí, Persian	6 30?		
ahamas -	8 0	3½	2½	Gulf.			
ble Id., Gala-	1 56	6		— Hamar-al-nafur,	9 30	10	
				Arabia, S.E. Coast.			
y, Florida -	8 23	2½	1½	— Jún Persian Gulf	11 30	10	
izree Bunder),	9 50	7		— Kabr " -		8½	
stan, W. Coast.				— Kais " -	0 45	7½	
e R., Africa, E.C.	4 15	10		— Kharg or Káreg " -	8 0	6½	
, Ireland -	4 34	12½	9½	— Larek " -	10 15		
Ireland -	5 10	11	8	— Tumb " -		8	
Ireland, W.	4 36	12½	9½	Jiddah, Red Sea -		2	
				Jijginsk Id., White Sea -	5 15	4	
pe, Tierra del	2 0	4		Joao San, Brazil -	6 24	14	10½
				Johanna Id., Comoro Ids.,	3 30	8½	
t, White Sea -	11 55	16		Mozambique.			
Scotland -	12 0	10		John St., Bay of Fundy -	11 21	27	23
Scotland -	12 18	12	9½	—, Newfoundland	7 30	7	
or Rd., Aus-	8 0	9		—, River, Africa,	4 0	5	
Coast.				S. Coast.			
d, Scotland -	5 11	11½	8½	—, River, U. S. -	7 28	5½	5
England -	12 35	13½		Jonquiere Bay, Gulf of	10 0	6	
United States -	11 26	10½	8½	Tartary.			
ad, Peru -	8 45	5		Joombas River, Africa,	8 10	6	
, Bermudas -	7 4	4		W. Coast.			
Cape, Magellan	1 0	8		Jooria, Hindoostan, W.C.	2 0	16	12½
				Josef, San, Port, Patagonia	10 0	30	25
rbour, Choiseul	5 20	6		E. Coast.			
kland Islands.				Jourimain Island, New	9 30	6	3
1 -	8 53	7		Brunswick.			
oudres, R. St.	4 25	17	10	Juan de Nova, Madagascar		5	
ce.				Juan Fernandez I., Chile	9 30	4	
s, Africa, W. C.	6 35	13		Juan San, Porto Rico -	8 2	1½	
ape, Arabia,	9 0	10		— San Port, Peru -	5 10	3	
ast.				Juby Cape, Africa -		8	
England -	4 44	21	15	Judith Point, United States	7 32	3½	3½
ort San, Ticao	6 30	6		Jukan Ids., Lapland -	9 0	13	
inas.				Julian, San, Port, Pata-	10 45	30	
ort (N. Head),	8 15			gonia, E. Coast.			
a.				Julianshaab, Greenland -	5 6	7	5
. Domingo -	irr.	2-3?		Julien, St., Harbour, }	7 21 A.M.	4½	3
Hindoostan, W.	11 35	9	7½	Newfoundland.	6 30 P.M.		
				Junk River, Africa, W. C.	5 45	5	
(Adam Cove),	2 14	5		Junkseylon Id. (E. Side),	10 0	11½	
oa.				Malacca Strait.			
N. side, Gal-	2 34	5		Jura Island, (E. Side)	4 56	3½	2½
				Scotland.			
				— Feolin Ferry " -	4 41	6½	4½

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs	Neaps.			Springs	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Kaikora Penin, New Zealand.	5 30	8	6	King Port, Falkland Ids.	7 30	5	
Kaipara Harb. (entrance), New Zealand.	10 55	10	8	Kingstown, Ireland -	11 10	11	8
Kalgalakaska, White Sea	6 50	7		Kinsale, Ireland -	4 43	11½	9
Kalian Point, Banka Strait	8 17*	12½		Kinsiang Point, China, E. Coast.	7 0		
Kandalaksha, White Sea	3 25	7		Kircubbin, Ireland -	13 42	11½	9
Kanushin Cape, White Sea	11 54	15		Kirindi, Ceylon -	3 30		
Kapiti Island, New Zealand	9 0	6		Kirkcudbright, Scotland	11 10	23	
Karachi Harb. (entrance)	10 30	9½	6	Kirkwall, Orkneys -	10 9	10	7
Hindoostan, W. Coast.				Kishm, see Keshm.			
Karakoa Bay, Owyhee -	3 49			Kitnapatnam, Bay of Bengal, W. Coast.	11 0	1½	
Kata, Japan Sea -	6 4	6½		Knox Bay, America, N. W. Coast.		11	
Katwyk, Netherlands -	2 30	5	7	Koepang, Timor -	11 0	9	6
Kawan Id., New Zealand	6 30	10		Kokohn, New Zealand -	10 15	10	7
Kawhia Harb., New Zealand.	9 30	12		Kok-si-kon Pnt. (Formosa)	11 30	3	
Kedewarry, Hindoostan	9 57	9		China Sea, E. Coast.			
Keelacarry, Ceylon -	11 0			Koombanah B., Australia, W. Coast.	9 0	½-3	
Kedgerie, Bay of Bengal	11 30			Koree R. (Monda Point), Hindoostan, W. Coast.	11 40	11	
Keeling Islands (Port Refuge), Indian Ocean.	5 30	5		Kouloi River -	1 15	20	
Kegashka B., G. St. Lawrence.	10 45	5	3	Kou Zomen, White Sea -	3 30	6	
Kelung Harb. (Formosa), China Sea, E. Coast.	10 30	3		Koweit, Persian Gulf -	0 15	9	
Kenmare R. (W. Cove), Ireland.	3 52	10	7½	Krakatoa, Strait of Sunda	7 0	4	
Kenn Reef, Australia, E. Coast.	8 0	5½		Kuper Port, America, N. W. Coast.	1 40	13	10
Kennebec River (Hanniwells Point), U.S.	11 15	9½	8	Kuriyán Muriyán Bay and Islands, Arabia, S.E. Coast.	8 20	6½	
Kent Island, Bass Strait	11 10			Kurrachee, see Karachi.			
Kentish Knock, England	11 47			Kweshan Ids., China, E. Coast.	9 30	14	
Keppel Bay, Australia, E. Coast.	9 30	9-14		Kyem River, White Sea	5 23	4	
Keret, White Sea -	3 8	6		Kykduin, Netherlands -	7 0	12	
Point, White Sea	4 30	5½		Kyle Akin, Loch Alsh, Scotland.	6 16	15½	11
Kerguelen Island, Indian Ocean.	2 0	2		Kyle Rhea, Scotland -	6 0	15	11
Keshm, Persian Gulf -	11 0	12		La Poile Bay, Newfoundland.	9 0	6	4
Kettle Cove, United States	7 48	5	4½	Labuan Id., China Sea, E. Coast.	9 45	6	
Khór Jerámeh, Arabia, S.E. Coast.	9 30	10		Labyrinth Ids., Magellan Strait.	0 30	5½	
Kilbaha, Ireland -	4 16	13	9½	Lacul Harb., St. Domingo	6 0?	3?	
Kilda, St., Hebrides -	5 30			Lady Bay, Australia, S.C.		4	
Kildin Id., Lapland -	6 45	12		Lady Elliot Islet, Australia, E. Coast.	9 0	7-8	
Kilkieran Cove, Ireland -	4 34	15½	11	Lagos, Portugal -	2 7	13	
Killala Bay, Ireland -	5 22	10½	8	— River, Bight of Benin.	6 0	2	
Killeany Bay, Arran Ids., Ireland.	4 28	13½	10	Laguimanoc Port, Luzon	1 30	5½	
Killingholme (Humber R.), England.	6 2	19½	15½	Laguna de Terminos, G. of Mexico.	noon.	1½	
Killybegs, Ireland -	5 16	11½	8½	Lamalin, Newfoundland	9 15	8½	
Killyleagh, Ireland -	12 40	11	9½	Lambayeque Rd., Peru -	4 0	3	
Kilmichael Point, Ireland	8 30	4½	3	Lamlash, Scotland -	11 49	10	7
Kilrush, Ireland -	4 42	14	10½	Lamo Harb., Africa, E. Coast.	4 6	11	
Kincardine, Firth of Forth, Scotland.	2 53	17½	15	Lancaster, England -	11 16	5½	
King Id., Bass Strait -	1 0						

\* In N.W. monsoon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
pping, Cleddau	h. m.	ft.	ft.	Little Egg Harbour, }	h. m.	ft.	ft.
, Wales.	6 27	20	14½	United States }	7 10	4½	3½
anCrossing, Yang-	1 40	12	8	Little Fish Bay, Africa,	2 30	5-6?	
yang.*				W. Coast.			
Bay, China, E.C.	10 0	13		Little Gull Island, U. S. -	9 38	3	2½
ate, Canary Ids. -	1 0?	9?		Littlehampton, England	11 36	16	11½
B, Magellan Strt.	11 30	9		Little Metis, G. St. Law-	2 10	13	8
Scotland	11 50	10		rence.			
Id., Africa, E. Cst.	4 0	10		Little Milford Quay,	6 31	19	13½
e Bay, Tierra del	2 5	4		River Cleddau, Wales.			
ra.				Little Natashquan, G.	11 0	5	3
Great and Little,	8 15	7	4	St. Lawrence.			
foundland.				Liverpool, England -	11 23	26	20½
Harb., Tierra del	1 0	6		Bay, Nova	7 50	8	5
ra.				Scotia.			
Cove, Chile -	9 20	5		Liza Bay, Lapland -	5 58	9	
ice, Great St., Harb.	8 30	7	4	Lizard Id., Australia, E.	9 15	7-10	
foundland.				Coast.			
ave Cape, Nova	7 48	7	5½	Point, England -	5 0	14½	10½
ia.				Llanelly (Bar), Wales -	6 16	28	21
ire Strait, Tierra	4 0	7		Lloyd Port, Bonin Ids. -	6 8	3	
uego.				Loanda, San Paul de,	4 30	5	
g Fiord, Farø Ids.	0 30	6½	4½	Africa, W. Coast.			
Scotland - -	2 17	16½	12½	Lobah Point, Banka Strait	11 0†	10	
Shoal, England,	6 0			Lobito B., Africa, S.W.	2 20	5	
oast.				Coast.			
Cove, Tierra del	4 40	8		Lobo Point, Peru -	8 0		
ra.				Lobos Cay, Bahamas -	7 40	3	
d Port, Barrow	12 6	6	4½	Lobos Head, Patagonia,	0 29		
it.				W. Coast.			
n, Bay of Fundy -	11 18	24½	21	Loch Aline, Scotland -	5 33	13½	10½
k, Shetland	10 30	6	4	Alsh "	6 16	15½	11
g Harb., Bay of	11 19	23½	20	Broom "	6 40	14½	10½
ly.				Carron "	6 29	16½	11½
River, Chile -	10 30	5		Duich "	6 0	15½	11
Port, Madagascar	3 30	7½		Dunvegan, "	6 7	15½	11
r Bay Africa, W.	12 0	6-7		Eil "	5 15	13	9
st.				Eport "	6 6	12½	9½
Cape, St. Labrador	6 30			Eriboll "	7 43	14½	11
Cape (G. of Siam),	5 7	6½		Erisort "	6 43	15½	11½
in Sea, W. Coast.				Ewe "	6 39	14½	10½
Ho (Bar), Yellow	4 0	11		Goil "	12 6	10	6
Sea.				Hourn "	5 45	13½	10½
— (entrance) -	5 0	12		Inver "	6 41	14	11
ing Gulf (Sand	4 50	7	5½	Laxford "	6 44	15	11½
st), Yellow Sea.				Long "	12 6	12	
— N.W. Head of	5 30	10	8½	Maddy "	6 6	12½	9½
				Mudart "	5 44	13½	9½
ek, Ireland -	6 16	18½	13½	Nevis "	5 47	14½	10
River (entrance),	4 15	12		Roag "	6 11	11	8
ca, E. Coast.				Ryan "	11 12	11	
Island, Persian Gulf -	12 0?			Strivan "	11 55	6	
Island, Canton R.	12 0	7½		Tarbert, West, Har-	6 4	11½	8½
in, E. Coast.				ris Island, Scotland.			
(Belem), Portugal	2 30	12	9	Tarbert, East, Scot-	6 10	13½	10
or Bay, Ireland -	4 23	13½	10	land.			
ab Harb., Nova	8 0	6½	4½	Tongue "	7 53	15	12
ia.				Torridon "	6 20	15	11
Bay, China, E. C.	10 15	16		Tuadh "	5 29	11½	8
benchmark -	2 21	6		Lofoten Ids., Norway -	12 0	9	7½
Ridge, White Sea -	11 45	15		Loheia, Red Sea -	1 30	3	

observations made in March 1861 by Commander Ward, H.M.S. Actæon.

† In S.E. monsoon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise	
		Springs.	Neaps.			Springs.	Neaps.
Loire R. (St. Nazaire), France.	h. m. 3 40	ft. 15½	ft. 11	Madame Id., Madagascar	h. m. 4 0	ft. 5	
Lomas Point, Peru	8 19	5		Madoc Port, Wales	7 30	17	
Lombok, (AmpanamB.), Java Sea	8 0	6		Madras Road, Coromandel Coast.	7 34	3½	
London Bridge, England	2 7	19½	16¾	Magadoxa, Africa, E. Cst.	4 30	8	
— Docks, England	1 57	19½	17	Magdalen Ids., G. St. Lawrence.	8 20	3	
Londonderry, Ireland	8 1	7¾	5½	Magdalena Sta., Island, Magellan Strait.	12 0	10	
Loe (East), England	5 26	16	13	Magdalene B., California	7 35	6½	
Lookout Point, United S.	0 58	2	1½	Mahato Id., Africa, E. C.	4 30	7	
Lopez Cape, Africa	4 30	4-6?		Mahneah R., Africa, W.C.	7 40	11	
L'Orient (Port Louis), France.	3 11	13	9½	Mahone Bay, Nova Scotia	8 0	7	
Lo-shan-kan, Yellow Sea	4 30	11	9	Mahons R., United States	9 52	7	
Lough Larne, Ireland	10 48	6¾	6½	Maiden Rocks, Ireland, N.E. Coast.	10 43	6¾	
— Rossmore, Ireland	5 20	11	8	Majambo B., Madagascar	4 30	16	
Louis Port, France	3 11	13	9½	Makatein, Arabia, S.E. Coast.	9 0	6	
— Mauritius	12 30	3	2½	Makalleh, Arabia, S.E. Coast.	8 30	7	
Louis, St., Bay, St. Domingo.	irr.	2-3?		Makumba R., Madagascar	4 45	17	
Louisburg Harb., Cape Breton Id.	8 0	5	4	Makung Harb., Pescadores, China Sea.	10 30	9½	
Low Bay, Falkland Ids.	5 0	5½		Malabrigo Port, Peru	5 0	2	
— Port, Patagonia, W. Coast.	0 40	7		Malacca Strait (light vessel one fathom bank).	6 0	15	
Lowestoft, England	9 57	6½	5½	Malacca Strait (off Mount Formosa).	8 0	11	
Lowly Pt., Spencer Gulf, Australia, S. Coast	7 0	6-8		— Road, Malacca St.	7 30	11	
Luabo River (entrance), Africa, E. Coast.		22		Malaga, Spain	12 0	3	
Lucas San, Bay, California	9 20	9½		Malahide Inlet, Ireland	11 15	10	
Lucipara Pass, Banka Strait.	irr.	10	7½	Malcolm Atoll, Maldives	10 30	3	
Luis St., Texas, G. of Mexico.		1¾	¾	Maldon, Chelmer River, England.	12 32	10	
Luis Obispo, San, California	10 8	4¾	3½	Malé, Maldives	12 30	3	
Lunaire Bay, Newfoundland.	7 0?	2-3?		Malludu Bay, Borneo	10 30	6-8	
Lundy Island, England	5 15	27	20	Malo, St., France	6 5	35	
Lung-mun Harbour, Yellow Sea.	10 0	7		Malpelo Point, Peru	4 0	10	
Lyme Regis, England	6 21	11½	8½	Man-of-War Cay, Bay of Honduras.	8 10	4	
Lynn Deep, England	6 0	23		Mana Island, New Zealand	7 0	8	
— Harbour		18		Manama, Persian Gulf	5 20	7	
— Road		20		Manawatu River, New Zealand.	10 0	8	
Mabou River, C. Breton Id.	9 0	4		Mancenilla Bay, St. Domingo.	7 0	4-5	
Macao, China, E. Coast	10 0	6½		Mandavee Roads, Hindoostan, W. Coast.	11 50	15	
Macassar, Celebes	4 40	5½		Mangalaum Id., China Sea, E. Coast.	11 0	5	
McDougall Harb., Africa, S.W. Coast.	2 30	5¾		Manicougon River, R. St. Lawrence.	2 15	12	
Maceio, Brazil	4 30	8½		Manila (Luzon Island), China Sea, E. Coast.	10 40	2½	
Machias, Seal Id., Bay of Fundy.	11 5	18	14¾	Manning River, Australia E. Coast.	10 0		
Macow, Red Sea	0 30	2		Manora P., Karachi, Hindoostan, W. Coast.	10 30	9½	
Macquarie Harbour, Tasmania.	7 30	3		Manorah R., Hindoostan, W. Coast.	1 30	16	
— Port, Australia, E. Coast.	8 56	4-5					
Macquereau P., G. St. Lawrence.	2 0	5	3				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Port, Ecuador -	3 4	6		Mayumba, Africa, S.W.C.		7	
San Har. (entrance),	9 30	13	10	Mazambo Port, Mada-	4 30	15	
Zealand.				gascar.			
branch Harb., Falk-	7 40	7½		Mazatlan, Mexico, W. Cst.	9 40	7	
land Ids.				Meichen Sound, China, E.C.	12 30	17	
Light (Thames),	12 5	14½	10½	Melbourne, Australia, S.C.	1 20	3	
land.				Melinda P., Africa, E. C.	4 15	11	
Green Point, G. of	2 0	5	3	Mellacoree R., Africa,	7 40	11	
Lawrence.				W. Coast.			
Sham, Brazil -	7 0	17½		Mellish Reef (Sand Cay),	7 55	5-6	
Head, United States	11 30	12		Australia, E. Coast.			
Harb., Tierra del	3 10	6		Mellon, Ireland -	6 1	18½	13½
go.				Melo Port, Patagonia, E.C.	3 40	15	
St. France -	9 55	20		Memory Rock, Ba-	7 50	3	
Harb., Falkland Ids.	6 0	6		hamas.			
te, England -	11 40	15½	13	Menadou Bay, C. Breton	8 15	5½	
Sta., Id., Chile -	10 20	6		Island.			
Van Diemen Cape,	8 0	7		Menam River, (Paknam),	5 7	9½	
Zealand.				China Sea, W. Coast.			
ow, River Tavy,	5 47	8½	4½	Menemsha Bight, U.S. -	7 45	4	2½
land.				Mensular Id., S.E. end,	6 0	4	
St., Bay of, St.	8 0?	1?		Sumatra.			
ingo.				Merbát, Arabia, S.E. Cst.	9 0	6½	
St., United States	1 14	3	2½	Mercy Bay, Banks Land		2	
River, Guayana	5 30	8	6	Mercury Bay, New Zea-	7 21	7	5
lan, Bay of Bengal	2 20	21		land.			
St., Cove, Tierra	3 30			Mergui, Bay of Bengal,	10 30	18	
Fuego.				E. Coast.			
C. Horn	3 50	8		Merigomish, Nova Scotia	10 6	5½	3½
Tierra del Fuego,				Merjee R., Hindoostan,	11 0	7	
St., de la Arena,	3 30	15		W. Coast.			
n, N. Coast.				Merville, France -	9 36	21	17½
Vas Rocks, South	3 45			Metway Port, Nova Scotia	7 50	8	5
antic.				Mevagizey, England -	5 4	15½	12
Cape St., New-	8 30	7	5	Mexillones Port, Bolivia	10 32	3	
land.				Mezen, White Sea -	1 48	15-22	
St. Harb., Mada-	4 0	5		Miau-tau, (Depôt Bay),	10 35	6	
ar, E. Coast.				Yellow Sea.			
Newfoundland -	7 40	7½	5	Miaveness, Færoe Islands	3 12	6½	4½
Port St., I. of Man	11 10	20	16	Michael, St., Azores -	12 30	6	
St., Scilly Is. -	4 27	16	12	Michael Seymour Port,	5 30	3	
ort, England -	11 3	18	13	Gulf of Tartary.			
t, Persian Gulf -	11 15	6		Middle Cove, Tierra del	3 30		
B, New Zealand -	11 10	8	6	Fuego.			
ere Bay (Tasman	8 45	13	9	Middle Island, Patagonia,	12 0		
ier), New Zealand.				W. Coast.			
ere Bay, Motu Pipi	9 50	14	10	Middlesbrough, R. Tees,	3 55	13	
er, New Zealand.				England.			
wah, Red Sea -	1 0	3		Middleton R., Bight of	4 15	5	
River, G. St.	2 15	11	7	Benin.			
rence.				Milford Haven (St. Ann	5 56	24	18
River, Chile -	10 0			Lighthouse), Wales.			
ain, Bay of Bengal	2 0	22	17	Milford Sound, New Zea-	9 15	8	6
tius (Port Louis) -	12 30	3	2½	land, Mid. Island.			
— (Grand Port) -	1 0	1½		Millman Island, Palawan,	10 27	2½	
Cape, United States	8 19	6	5	W. Coast.			
ry Bay, Palawan -	9 55	3½		Millport, Cumbrae Island,	11 50	10	6
Id., Indian Ocean	4 0	6½		Scotland.			
Id., Mozambique	4 10	11½		Min R. (Temple Point),	10 45	19	14½
				China, E. Coast.			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Spring.	Neaps.			Spring.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Min R. (Losing Island), China, E. Coast.	12 0			Mount Desert Island, United States.	11 10	13	
Mindanao, Filipinas -	7 0	6		Mourondava, Madagascar, W. Coast.	4 45	12	
Minehead, England -	6 30	35	26½	Mouton Port, Nova Scotia	7 54	7½	1
Mingan Harbour, Gulf St. Lawrence.	1 16	6	4	Moville, Ireland - -	7 6	7½	1
Mingan Id., G. St. Lawrence	1 30	6	4	Mozambique Har., Africa, E. Coast.	4 15	12	
Minimegash, Prince Edward Island.	3 30	5	3	Mucaras Reef, Bahamas	7 40	3	
Minow Islands, Madagascar, W. Coast.	5 0	15		Mugeres Harb. Bay of Honduras.	9 30	1½	
Minquiers Rocks, France	6 6	35	26	Mull of Cantyre, Scotland	10 35	4	
Miramichi (Bar), Gulf St. Lawrence.	5 30	5	3	Mulroy Bay (Bar), Ireland	5 40	11½	1
Mira-por-voa, Bahamas -	9 30	3	2½	Mumbles Lt. House, Wales	6 1	27½	20
Mirs Bay (Tide Cove), China, E. Coast.	10 0	6½		Mungullo or Mongallo R., Africa, E. Coast.	4 45	12	
Miscou, G. of St. Lawrence.	2 30	5	3	Murdounah Id. (E. Cst.), Red Sea.	6 0	3	
Mississippi, S. W. Pass, Gulf of Mexico.		1½		Murray Islands, Torres Strait.	9 30	10	
Mistanoque, Labrador -	10 30	6	3	Murray Pass, Bass Strait	11 10	8	
Mistley Quay, Stour R., England.	0 48	11½		Musa Port, Babuyan Ids.		5	
Mobile, Gulf of Mexico	irr.	1-2		Mutlah River, (entrance to Biddah River), Bay of Bengal, W. Coast.	10 0	14	
Mocha Island, Chile -	10 30			— (Muda Kali), Bay of Bengal, West Coast.	11 45	15	
— Road, (E. Coast), Red Sea.	12 0	4½		Mutton Island, Ireland, W. Coast.	4 20	13½	1
Mogador, Africa, W. Cst.	1 18	10-12		Myggenæs Fiord, Færoe Islands.	9 0	9½	1
Mollendo, Peru - -	8 0	5		Naafe R., Bay of Bengal, E. Coast.	10 0		
Molynæux Bay, New Zealand.	3 0	8	6	Naalsœe Fiord, Færoe Islands.	4 0	6½	1
Mombaza Port, Africa, E. Coast.	4 0	11		Nafa-Kiang, Loo Choo Islands.	6 28	7	
Monach Ids., Scotland, W. Coast.	5 44	12½	8½	Nagasaki Bay, Japan Sea.*	7 15	9	1
Mondego (Bar), Portugal	2 30	7		Nagore, Bay of Bengal, W. Coast.	8 15		
Monganui Harb., New Zealand.	8 15	9	7	Namki Ids., China, East Coast.	8 30	17	
Monomoy, United States	11 30	5½	4	Namoa Island (Clipper Road), China, E. Coast.	11 15	7	
Monrovia, Africa, W. C.	6 0	6		Namquan Harb., China, E. Coast.	10 0	17	
Montank Pt., United States.	8 20	2½	2	Nanaimo Harb., Gulf of Georgia.	5 0	14	
Monterey, California -	10 22	4½	3½	Nancowry Harb., Nicobar Islands.	9 15	8½	
Montrose, Scotland -	1 25	13	10	Nangamesie Harbour, Sumba.	11 30	17	1
Monts, Point de, Gulf St. Lawrence.	12 0	12	6	Nangka Id., Banka Strait		12	
Moreno (Constitucion Road), Peru.	10 0	4		Nansaree River (Bar), Hindoostan, W. Coast.	3 0	18	
Moreton Bay, Australia, E. Coast.	9 30	3-7		Nantucket, United States	12 24	3½	
Morewellham, R. Tamar, England.	6 12	10½	6½	Napoleon Road, Gulf of Tartary.	2 30	2½	
Morjovets Id., White Sea	11 20	17					
Morlaix Road, France -	4 53	24	18				
Morro (Sandy Pt.), Ecuador.	5 0	11					
Mossel B., Africa, S. Const.	3 15	6					
Moudinga Id., White Sea	5 50	3½					

\* Deduced from observations made in 1861, by Commander Ward, H.M.S. Acteon.

Loc.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Bay, Madag.	h. m. 4 30	ft. 15		Nicholson Port (Lambton Harbour) New Zealand.	h. m. 4 30	ft. 5	3
Coast.				Nicobar Id. (Nancowry Harb.), Indian Ocean.	9 15	8½	
Strait, Magellan	9 0	36-42		Nicolas, St., Bay, Magellan Strait.	2 6		
Second, Ma-	10 0	23		Nicoya Gulf (Port Heradura), Cent. America.	3 9	10	
nit.				Nieuport, Belgium	12 18	16	13
kura) Japan	6 17	7		Nieuwediep, Netherlands	7 27	4	3½
nt, Bristol	6 25	33	25	Niger River (Nun entrance), Africa, W. Coast.	4 8	6	
Providence,	7 30	3-4		Nikolskoi Chan., White Sea.	5 25	3	
Tierra del	4 0	6		Tw., White Sea	6 0	2	
Africa, S. C.	4 30	6		Nimrod Sound, China, E. Coast.	10 30	20	
t, France -	3 42	13	9½	Ninepin Group, China E. Coast.	10 0	5	
France -	3 40	15½	11	Nin-po-fu, Yung River, China E. Coast.	1 0	9	
England -	12 6	12½	10	Nisqually, America, N.W. Coast.	6 0	18	15
bour, Oregon	12 33	7½	6½	Noamh Island, Scotland	5 2	11½	7
nt, England -	9 46	7½	5	Noel, Bay of Fundy	12 41	50½	43½
B. of Bengal	5 0	3		Noir Island, Tierra del Fuego.	2 30	5	
bour, Nova	8 12	7	5½	Noirmoutier, France	3 2	16	11½
Patagonia	11 0	14		Nolloth Port, Africa, S.W. Coast.	2 30	5½	
Zealand -	9 50	14	10	Norderney, Germany	10 30	8	
Gulf St.	2 10	13	8	Nore, England	12 30	15½	13
River St.	8 30	14	9	Norfolk Island, S. Pacific	7 45	7	
l (entrance),	7 57	4½	4	North Cape, C. Breton Id.	8 0	4	
atea.				Edisto River, United States.	7 10	7	5½
United States	11 53	7	6½	North Harbour, Newfoundland.	8 0	7½	5
United States	11 16	6½	5½	Sands, Malacca Strait.	5 30	15	12
lon, United	9 28	3	2½	Noos Island, Madagascar	5 0	15	
lence, S. W	7 30	4		Nova Zembla Harbour, Lapland.	6 36	10	
mas.				Nuevo Gulf, Patagonia, E. Coast.	7 0	10	
ille, United	11 22	8½	7½	Port, Central America.	3 10	12	
reland -	6 4	12½	10	Nukulan Port, Fiji Ids.	6 47	5½	11½
ound, Tierra	3 30			Nunex River, Africa.	10 0	15	
United States	8 13	5½	4½	Nyminde Gab, Jutland	2 41	2	
t, United	11 22	9	7½	Nysna Harbour, Africa, S. Coast.	3 45	5	
Australia, E.	9 45	6-7		Oban, Scotland	5 22	12	9½
England -	4 23	10½		Obb of Harris, Isle of Harris, Scotland.	6 16	11½	8½
reland -	10 30	16	12	Observatory Id., China Sea, E. Coast.	11 0	5½	
England -	11 51	20	15	Ocracoke Inlet, United States.	7 4	2½	2
ited States -	7 45	4½	4	Octavia Bay, New Granada.	3 30	13	
ales, (South	7 10	24	18				
— (West	7 0	12	9				
Wales -	7 30	15					
ay, China,	8 30	5½					
, Harb., G.	1 55	12	7				
ce.							
Port, Peru	5 15	3					



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Oelar Cape, Banka Strait	6 30	12		Oystreham, France -	9 38	21	10
Oibo Harb., Africa, E.C.	4 15	6		Packsaddle Bay, Tierra del Fuego.	3 30	6	
Olaveaga, Bilbao River, Spain.	3 15	12		Padstow, England -	5 13	20½	10
Old Pt., Comfort, United States.	8 17	3	2½	Pagham (entrance), England.	11 30	16½	15
Old Providence, Bay of Honduras.	irr.	1		Paimpol, France - -	6 0	31	20
Olenji Islands, Lapland -	7 30	12		Palais, Port le, Belle Ile, France.	3 18	14½	10
Oleron, Ile d', France -	3 50	19		Palliser Cape, New Zealand	6 0	6	
Omaider Island (Gulf of Akabah), Red Sea.	6 0	4		Palma, Canary Ids. -	12 30?	9?	
Omersary R., Hindoostan, W. Coast.	1 45	18		Palmas Cape, Africa, W. Coast.	4 30	4	
Omonville, France -	7 29	15½	12½	Palmedo Road, Sumba Id.		15	
'Om-rasas-Masirah, Arabia, S.E. Coast.	10 0	10		Palmeira Point, Ceylon -	9 30	7-11	
One Fathom Bank Light, Malacca Strait.	6 0	15	12	Paloan Bay, Mindoro -		5	
Onega River, White Sea	9 17	6-7		Pamarung Ids., Borneo, E. Coast.		8-10	
Ooloogan Bay, China Sea, E. Coast.	9 30	5½		Pampang Bay, Java -		7-8	
Oonting Port, Loo Choo Islands.	6 35	8		Panama Road, Central America.	3 23	15-22	10-
Oshima, Japan Sea -	6 50	5		Pancol, China Sea, E.C.	9 40	6	
Oporto, Portugal - -	2 30	10		Pansand Hole, England -	12 0	15½	13
Orange B., T. del Fuego	3 30	5		Paposo, Chile - -	9 40	5	
—Cape, Magellan Strt.	3 0			Paquique Cape, Bolivia -	10 45	-	
Orford Haven (Bar), England.	11 30	7½		Para, Brazil, N. Coast -	12 0	11	
— Port, California -	11 26	6½	4½	Parahayba, Brazil -	5 0	9-12	
— Quay, England -	12 30	7½		Parenga-renga Harbour, New Zealand.	7 54	7	
Orfordness, England -	11 15	8	6½	Parida Id., New Granada	3 15	10½	
Orinoco River (entr.) Guayana.	6 0	3		Parisboro, Bay of Fundy	12 17	43	37
Orleans Id., R. St. Lawrence.	5 40	17	13	Passado Cape, Ecuador -	3 30	10	
Ormond, Kenmare River, Ireland.	3 43	10	7½	Passages Port, Spain -	3 0	12	9
Ornsay, I. of Skye -	5 50	14½	10½	Passage or Culebra P., Caribbean Sea.	9 0	1	
Orlov Letni C., White Sea.	5 18	4		— Id., Banda Sea -	noon	6	
Os Ilheos, Brazil -	4 30			Passandava Bay, Madagascar, W. Coast.	5 0	15	
Osaki, Japan Sea -	5 55	6½		Patapasco R. (Bodkin Pt.) United States.	5 42	1½	1
Oscuro Cove, Patagonia, W. Coast.	0 55	20		Patersons Inlet, New Zealand.	1 10	8	6
Ostend, Belgium -	12 25	19	15	Patrick Port, Scotland -	11 10	15	15
Otago Har., New Zealand	2 50	7	5	Patta B., Africa, E. Cst.	4 30	10	
Otaheite, South Pacific -	noon	1½		Paul de Loanda, San, Africa, S.W. Coast.	4 30	5	
Otterswick, Orkneys -	9 13	11	8	Paul St. Id., Indian Ocean	11 0	3	
Otway Port Patagonia, W. Coast.	11 37	6		— G. St. Lawrence	8 0	5	4
Ounalashka Id., America, N.W. Coast.	7 30	7½		Paumben Pass, Bay of Bengal, W. Coast.	1 30	2	
Ouro R., Africa, W. Cst.	12 0	8-9		Payta Port, Peru -	3 20	3	
Onse, R. (Goole), England	7 44	14		Peckett Har., Magln. Strt.	12 0	6	
Ower Shoal, England, E. Coast.	6 30			Pedro Gonzales, New Granada, (Trapichi Island).	3 50	16	
Oxneashiea, Norway -	12 0	8		Pedro San., Pass. Patagonia, W. Coast.	0 30	9	
Oyster Bay, United States	11 7	9½	8	— San Bay, California	9 39	4½	4
				Peel, Isle of Man -	11 8	16½	15
				Pegasus Port, New Zealand	11 50	8	10

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
o River, (entrance), flow Sea.*	h. m. 3 10	ft. 10	ft. 8-9	Philip B., Hobson Bay, Australia, S. Coast.	h. m. 3 0	ft. 3-4	ft.
r Islands, N. Pacific		6		Piankatank R. (Cherry Point), United States.	10 5	2	$\frac{3}{4}$
an Lagoon, Kangaroo , Australia.	5 0	6		Pichidanque Bay, Chile -	9 20	5	
us Sound, New land.	9 35	11	7	Pictou Har., Nova Scotia	10 0	6	4
a Channel, Mozam- que.	4 0	11		Pidoe Bay, Lombok -		10-12	
— Id., Mozambique	4 15	12		Piel Harbour, England -	11 5	28	21
roke Dockyard, Is.	6 12	21	15 $\frac{1}{2}$	Pierre, St., Newfoundland	8 33	6 $\frac{1}{2}$	4 $\frac{1}{2}$
g, Malacca Strait -	12 0	9	7 $\frac{1}{2}$	Pigeon Bay, Yellow Sea	11 45	8	
— Cape, Tierra del go.	6 2	12		Pihkishan Ids., China, E.C.	8 30	17	
he, Portugal -	1 54			Pillar C., Magellan Strt.	1 0		
ark Rocks, France	3 16			— Cape, Tasmania -	1 0	6	
ngton R., Bight of in.	4 15	5		Pillars, R. St. Lawrence	5 0	17	10
cola, G. of Mexico		1 $\frac{1}{2}$		Pinas Bay, New Granada	3 15	14	
lie, R. Tamar, land.	5 55	13 $\frac{1}{2}$	9 $\frac{1}{2}$	Pinmill, Orwell River, England.	12 20	12	
and Firth, Stroms, S. Side.	9 47	9	6 $\frac{1}{2}$	Pio Quinto Port, Babu- yan Islands.	6 0	6	
— Swona, E. Side	10 24			Pisco Bay, Peru -	4 50	4	
— W. Side	9 35			Piti Palena, Patagonia, W. Coast.	12 23	10	
— Great Skerry, E. Side.	11 4	9 $\frac{1}{2}$	6	Pitty, Hindoostan, W. C.	10 5	9	
— W. Side	10 53			Placentia, Newfoundland	9 15	8	
nce, England -	4 30	16	12 $\frac{1}{2}$	Playa Marie Bay, Cali- fornia.	9 20?	7-9?	
Isles, Middle Id. -	10 30	16		Playa Parda Cove, Ma- gellan Strait.	1 8		
— South Islet, Australia, E. Coast.	10 30	14		Pleasant Port, Falkland Islands.	5 0	6 $\frac{1}{2}$	
Id., G. of Aden -	12 0	7		Plettenberg Bay, Africa, S. Coast.	3 10	6	
mbuco, Brazil -	4 45	8-6		Ploughrescan, France -	5 17	25 $\frac{1}{2}$	18 $\frac{3}{4}$
Banhos, Indian an.	1 30	5		Ploumanach, France -	5 15	24 $\frac{1}{2}$	18 $\frac{3}{4}$
se, La, Strait, Japan	10 30	6		Plymouth Breakwater, England.	5 37	15 $\frac{1}{2}$	11 $\frac{1}{2}$
Scotland -	3 35			— (Sutton Pool)	5 32	15 $\frac{1}{2}$	11 $\frac{1}{2}$
lore Ids. (Makung b.), China Sea.	10 30	9 $\frac{1}{2}$	7	— United States	11 19	11 $\frac{1}{2}$	10 $\frac{1}{2}$
St., Bay, C. Breton nd.	7 30	6	4	— New, New Zealand.	9 30	12	9
— Harb., Prince ard Island.	8 30	4	2 $\frac{1}{2}$	Pomba B. Africa, E. Cst.	4 0	15	11
ead, Scotland -	0 34	10 $\frac{1}{2}$	8 $\frac{1}{2}$	Pomquet, Nova Scotia -	9 15	4	2 $\frac{1}{2}$
Passage, B. of Fundy	10 41	22	18	Ponga River, Africa, W. Coast.	7 30	12	9 $\frac{1}{2}$
Port, B. of Islands, foundland.	10 42	5 $\frac{1}{2}$		Poolbeg Lt. Hsc., Ireland	11 12	12-14	9-11
Bay, St. Francis , Australia, S. Coast.	12 0	6		Poole, England - -	{ 9 10 } { 12 45 }	{ 6 $\frac{1}{2}$ } { 14 $\frac{1}{2}$ }	{ 4 $\frac{1}{2}$ } { 10 $\frac{1}{2}$ }
ra Rock, Patagonia, Coast.	0 50	16		Poolewe, Loch Ewe, Scotland.	6 39	14 $\frac{1}{2}$	10 $\frac{1}{2}$
elphia, U. States -	1 18	6 $\frac{1}{2}$	5 $\frac{1}{2}$	Pootoo Island, China, E. Coast.	8 15	12	
— E. side, Ma- in Strait.	9 30	24		Poqueldon Harb., Pata- gonia, W. Coast.	0 54	18	
Port, Capel Bay, Australia, S. Coast.	2 30	3-4		Portaferry, Ireland -	12 0	18-21	12-16
— entrance, Australia, S. Coast.	1 30	3-4		Port-au-Choix, Newfound- land.	10 47	5	
				Port au Prince, Saint Domingo.	8 0?	1?	
				Port-en-Bessin, France -	8 57	20	15 $\frac{1}{2}$
				Portchester, England -	11 46	13 $\frac{1}{2}$	10 $\frac{1}{2}$

\* Time and rise much affected by winds.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Portendik, Africa, W. C.	10 0	6		Pulo Aor, Sumatra, N.E. Coast.		5	
Porth Cawl, Wales -	6 8	28½	21½	Pulo Condore, China Sea, West Coast.	3 0	4	
Porth-dyn-lleyn, Wales	8 30	16		Pulo Leat, Gaspar Strait	2 30	4	
Portishead, England -	7 16	41½	31	Pulo Mendanao, " -	2 30	4	
Portland Inlet (Salmon Cove) America, N.W. Coast.	1 8	16		Pulo Panjang, G. of Siam	7 0	2	
United States	11 25	10	8½	Pulo Timooan (W. side), China Sea, W. Coast.	6 0	7½	
Bay, Australia, S. Coast.	Midnight.	4		Puluqui Id., Patagonia, W. Coast.	1 5		
Breakwater, England.	7 1	6½	4½	Puna Island, Ecuador -	6 0	11	
Porto Frio, Brazil -	2 40	4½		Pwlheli, Wales -	7 46	13½	
Porto Praya, C. Verde Ids.	6 0?	5		Quaco, Bay of Fundy	11 35	30	2
Portree, Isle of Skye -	6 32	15	10½	Quebec, R. St. Lawrence	6 38	18	1
Portrieux, France -	6 0	31	23½	Queda, Malacca Strait -	12 0	5½	
Portsmouth (Portsmouth) England.	11 48	6½*	4	Queen Charlotte Id. (entrance), New Zealand.	8 50	8	
Portsmouth Dockyard, England.	11 41	12½	10	Queensferry, Firth of Forth, Scotland.	2 37	18	1
Portsmouth, United States	11 23	10	8½	Queenstown, Ireland -	5 1	11½	
Possession Bay, Magellan Strait.	9 0	36-42		Quelan Cove, Patagonia, W. Coast.	0 28		
Cape, Torres Strait.	9 0	6		Quentin, Port San, California.	9 5	9	
Id., Torres St.	1 0	9½		Quicavi Bluff, Patagonia, W. Coast.	0 57	20	
Post Office Island (Charles Island), Galapagos.	2 10	6		Quicks Hole (S. side), U.S. (N. side) -	7 36	3½	
Id., Torres Str.	1 0	9½		Quilca River, Peru -	7 31	4½	
Pouinipet Island, Caroline Islands, N. Pacific.	6 0	4½		Quilimane R. (entrance), Africa, E. Coast.	8 0	6	
Poulamente B., Madame Id., C. Breton Id.	7 50	6	4	Quillebœuf, France -	4 15	16	
Poulton-le Sands, England	11 26	27½	21½	Quilloa, Africa, E. Coast	10 6	9½	
Poverty Bay, New Zealand	6 5	6		Quiloa, Africa, E. Coast	4 45	12	
Pratas Shoal, China Sea	4 0	5		Quoile Quay, Strangford, Ireland.	12 45	11	
Preservation Inlet, New Zealand.	11 20	8	6	Rabat, Africa, W. Coast	1 46	9-12	
Preston, England -	11 49	10	4½	Rachada Cape, Malacca St.	5 30	13	
Prince Frederick Harb., Australia, N.W. Cst.	12 0	28		Radama Port, Madagascar, W. Coast.	4 40	13	
Prince of Wales Strait, Banks Land.		3		Ragged Id., Sombawa, Java Sea.	8 10	3	
Princes Id., Bight of Biafra	3 45	4½		Point, Borneo, E. Coast.		7	
Princess Royal Harbour, Australia, S. Coast	11 56	1-4		Raine Id., Torres Strait	8 10	10	
Provincetown, U. S. -	11 22	10½	9½	Rajahpoor Harb., Hindoostan, W. Coast.	11 0	12	
Pubnico (Beach Point), Bay of Fundy.	9 25	12	10	Rajang River, Borneo -	4 45	13	
Puerto Bueno, Patagonia, W. Coast.	1 40			Ramos R., Bight of Benin	4 20	5	
Puerto de la Luz, Gran Canaria, Africa, W. Cst.	12 52	10		Ramree Road, Bay of Bengal, E. Coast.	10 0	12	
Puerto de la Plata, St. Domingo -	7 30	3?		Ramsay Sound, Wales -	6 0	17	
Puget Sound (Nisqually), America N.W. Coast.	6 0	18	15	Ramsey, Isle of Man -	11 12	19½	1
Pugwash Har., Nova Scotia	10 30	7	4	Ramsgate, England -	11 44	15	1
Pulaski Fort, United States	7 20	8	7	Ramso Fiord, Norway -	10 45	7	
Pulicat Shoals, Coromandel Coast.	9 25	2½		Rangoon, Bay of Bengal, E. Coast.	5 30	21	1
				R. (entrance) B. of Bengal, E. Coast.	3 15	21	1
				Rappahannock (Saunders Wharf), United States	3 2	2½	

\* Above the bed of the lake.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Fun, Africa, E. C.	6 15	4		Rochelle, France -	3 31	17	13
ohammed (Gulf of bah), Red Sea.	6 0	5		Rockport, United States -	10 57	10½	8
Sharmah, Arabia, Coast.	9 0	8		Rockall, N. Atlantic -	3 30	12	
Kheimh, Persian	11 45	7		Rocky Id., G. of Siam -	4 0	4	
Asidah, Arabia, Coast.	8 30	5½		Rodrigue Id., Ind. Ocean	1 45	6	
Bali, Arabia, S.E.	10 0	10		Romania Point (Malay Penin.), China Sea, W. Coast.	10 30		
Hed, Arabia, S.E.	9 30	9		Romdals Ids., Norway -	10 45	6	
Illan, Ireland -	5 42	12½	9	Rona (South) Light, Scotland.	6 20	14½	10½
or (G. of Cambay),	2 15	18	13	Roodewall Bay Africa, S.W. Coast.	2 30	6½	
oostan, W. Coast.				Roque, Cape St., Brazils		10	8
Cent. America	3 6	11		Roscoff, France -	4 46	23	17½
avi Inlet, Pata-	0 44	14		Rosel, Jersey, English Channel.	6 15	30	21½
W. Coast.				Roshnoff Cape, America, N.W. Coast.	7 30	15	
y, Ceylon, S. Cst.	2 20	2½		Rota, Spain -	1 24	12½	8
(Pier), Ireland	10 31	4	4	Rotterdam, Netherlands	3 45	7	
Labrador -	7 45	3½	1½	Rouen, France -	2 28		
Durian Strait -	5 0	10½		Rouge Harbour, Newfoundland.	7 0?	2-4?	
Cove, Bass Strait	12 5			Roundstone, Ireland -	4 28	13½	10½
ille, France -	6 20	35	26	Rovama River, Africa, E. Coast.	4 0	16	11½
ik, Iceland	5 0	17½	13½	Royal Harbour, Ruatan, Bay of Honduras.	7 45	3½	
vous Id., Borneo, Coast.		8		Royal Port, Jamaica -	11 0	1	
org, Denmark -	7 42	4		Royalist B., Palawan, E.C.	11 0?	6½?	
er, R. Clyde, Scot-	1 15	9		Royan, France -	3 38	13½	10
				Ruapuke Id. (Foveaux St.) New Zealand.	1 0	8	6
ion B., Marquesas	2 30	4		Rugged Id., Bahamas -	8 0	3	
Port, Tanna Id.	5 35	3		Nova Scotia	7 59	7½	6
n Id., (St. Pierre)	noon.	3½		Ruggles B., Falkland Ids.	7 30	5	
m O. (St. Denis)	0 22	2½		Rush Port, Ireland -	6 8	5½	3½
n Id., (St. Gilles)	1 0	2½		Rutland Id., Ireland, W. Coast.	5 22	11	8
m O. (St. Paul)	1 7	4		Rye Bay, England -	11 20	22	17½
Road, Fijii Islands.				Sabine Pass, G. of Mexico		1½	
Takulau Port.				Sable Cape (Clam Point), B. of Fundy.	8 27	8½	6½
Ohio Strait -	10 0	7	5	(Clarke's Harb.), B. of Fundy.	8 58	11	9
Lighthouse, Eng-	10 51	24	17	Sable Island, N. side, Nova Scotia.	7 30	4	
Acto R., Gulf St. rence.	3 30	4	2½	Sable Island, S. side, Nova Scotia.	6 30	4	
ond, United States	4 28	3½	2½	Sables d'Olonne, Les, France.	3 26	14	10
Harb., Prince ard Island.	6 0	3	2	Saboga, New Granada -	4 9	14	
R., Australia, E.C.	9 20			Sabon Id., Durian Strt.		10	
neiro, Brazil -	3 0	4	3	Sacred Bay, Newfoundland	7 23	2½	
egro, Patagonia, east.	11 0	14		Sacrificios Frt., Mexico, W. Coast.	3 15	6	
mez, Africa, W. C.	10 0	15	11½	Saddle Id., East, China, E. Coast.	11 0	14	
la Plata, La Plata	Noon	irr.	irr.	Sado (Yebisu), Japan Sea	5 0	2	
ucher, Campbell-	4 0	10	7				
G. St. Lawrence,							
o, Spain, N. Coast	3 0	15					
B., Australia, S.C.	10 0	4					
As, Atlantic -	5 15	10					
Cape, R. St. Law-	9 30	6	4				
ort, France -	4 6	17	13				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Saguenay, Chicoutimi, G. St. Lawrence.	h. m. 4 11	ft. 12	ft. 8	Santa Cruz or Agadir, Africa.	h. m. 12 45	ft. 9	1
Saguenay, Tadousac, G. St. Lawrence.	2 45	17	10	Santa Island, California	9 35?	5?	4
Saintes, Caribbean Sea -	6 45			— Tenerife, Canary Is.	1 30	8	
Sal, C. Verde Ids., Africa, W. Coast.	7 45	5		Santa Maria Island, Chile	10 20	6	
Salango Id., Ecuador -	12 41	12		Santander, Spain -	3 30	15	11
Salcombe, England -	5 41	15	11½	Santona, Spain -	3 30	12½	11
Saldanha B., Africa, W.C.	2 0	6		Saparooa Id., Moluccas -		6	
Sale Macowa, Red Sea -	0 30	2		Sapie Bay, Sumbawa -	1 0	10	
Salem, United States -	11 13	10½	8	Sarawak R. (Moratabas entr.), Borneo, W. C.	4 0	9	
Salm R., Africa, W. Cst.	8 10	6		Sarn Badrig or the Causeway, Wales.	7 30	13	
Salmedina Rocks, Spain	1 27	12½	8	Sarn-y-bwch Reef, Wales	7 40	14	
Saltash, R. Tamar, England.	5 45	15	11	Saugor Id., B. of Bengal		12	
Salt Cay Anchorage, Bahamas.	8 15	4	3	Saumarez Reef, Australia, E. Coast.	8 0	6	
Saltees, St. George's Channel.	5 40			Savannah (city), U. S. -	8 13	7½	4
Salvador, San, Port, Falkland Islands.	8 10	8		— (entrance), U.S.	7 20	8	7
Samanco B., Peru -	6 30	2		Scales Point, Blackwater River, England.	12 0	14½	11
Sambilangs, Malacca St.		12	10½	Scalloway, Shetland -	9 30	5½	4
San Francisco (North Beach), California.	12 6	4½	3½	Scarborough, England -	4 11	15½	11
San Bartholomew Port, California.	9 10?	7-9?		Scarcies Rivers, Africa, W.C.	7 10	10	
San Blas, Mexico, W. C.	9 41	6½		Scilly (St. Agnes Id.) -	4 30	16	11
San Juan (anchorage), California.	9 40?	5		— (St. Mary Id.), England.	4 27	16	11
— River, New Granada -	6 0	12		Sea Bear Bay, Patagonia, E. Coast.	12 45	20	
San Lucar, Spain -	1 53	12½	8	Seaforth Loch, Athline, Scotland.	6 16	15	11
San Miguel, California -	9 25	5	4	Seaham, England -	3 24	14½	11
San Rosa Id., California	9 30?	5?	4?	Seal Cove, Grand Manan, B. of Fundy.	10 54	20	11
Sand Cay, United States	8 40	2	1	Seal Id., C. Sable, Bay of Fundy.	9 49	12¾	11
Sandalwood Bay, Fiji Ids.	6 0	6?		Seamount Bay, Mulroy B., Ireland.	6 44	7½	
Sand Point, G. of Liangtung, Yellow Sea.	4 50	7	5½	Sebastian, San, Brazil -	2 0	4	
Sands Pnt., United States	11 13	9	7½	— Tierra del Fuego	7 0		
Sandy Cape, Australia, E.C.	7 50	6-8		— Spain, N. Coast	3 0	12	
— Cove, E., B. of Fundy	10 33	21½	17¾	Sedashigur Bay,* Hindoostan, W. Coast.			
— W., Bay of Fundy.	10 47	23	19	Sedili R., China Sea, W.C.	9 44	7	
— Hook, United States	7 29	5½	5	Sein, Isle de, France -	3 21	17½	1
— Island, Madagascar, W. Coast.	5 0	15		Seleney Bay, Lapland -	7 9	9	
Sanguiang (entrance) Ecuador -	4 10	9		Selsea Bill, England -	11 45	16½	1
Sanguir Island, Moluccas		6		Semiahmoo Bay, Juan de Fuca Strait.	2 0	12	
Sangwin R., Africa, W.Cst.	5 15	4		Senegal, Africa, W. Coast	10 30		
Sanmoon Bay (St. George Island), China, E. Coast.	10 20	15		Serrana Bk. Mosquito Cst.		2	
San-shui, Si Kiang, China, E. Coast.		5-6		Serranilla Bank, Mosquito Coast.	irr.	2	
Santa Catalina Id., California	9 35?	5?	4?	Sesham Islands, Hang-chu Bay, China, E. Coast.	11 45	14	
Santa Cruz R., Patagonia, E. Coast.	9 30	40	29	Setubal, Portugal -	2 30	8	
				Seudre, River, (entrance,) France.	3 31	15	1
				Seychelle Archip. (Mayhé Id. (Indian Ocean).	4 0	6½	
				Seypan Id., Ladrone Ids.	6 45	2½	

\* Spring tides rise a.m. 6 feet, p.m. 7½ feet from October to March; and the contrary during the rest of the year.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
nds, Lapland -	8 20	12		Sir E. Pellew Islands,	7 30	4-7	
Bay, Gulf	1 40	9	5	Australia, N. Coast.			
rence.				Sisal, Gulf of Mexico -		2	
dún, Arabia,	9 20	10		Sitka, America, N.W.C.	0 34	5-7	
ast.				Skaapen Fiord, Farø			
aifeh, Arabia,	9 45	10		Islands :			
ast.				Between Stormoe and	5 0	9½	7½
larb., Falkland	9 30	6		Sandoe.			
Yang-tse-Kyang	0 40	10	7	Between Hestoe and	5 30	9½	7½
E. Coast.				Sandoe.			
Si Kiang,		3		Skagen or the Skaw,	5 56	1	
E. Coast.				Jutland.			
ersian Gulf -	1 0	6		Skerry, Great, E. side,	11 4	9¼	6
, Australia, E.C.	12 0	2-5		Pentland Firth.			
Harbour, New	1 0			Skerry, Great, W. side,	10 53		
ick.	8 0	4	2	Pentland Firth,			
en, Ireland -	5 32	11½	8½	Skerries, Ireland, N. Cst.	6 15	5	3
England -	0 37	16	13½	— E. Coast. -	11 0	13	10
rb., Nova Scotia	8 6	6½	4½	Skip Ness, Scotland -	11 50	9	
land, Africa, S.C.	4 40	12		Skull, Ireland -	4 2	9¾	7½
Island, U. States	10 58	8½	7½	Slaughden, Orford, Eng-	1 0	7½	
, Nova Scotia -	8 4	7	5½	land.			
Island, Gulf	6 0	5	3	Slievebane Bay Ireland.	5 49	10½	7½
rence.				W. Coast.			
L., Africa, W.Cst.	6 0	11		Sligo (Bay), Ireland -	5 18	11½	
North, England	3 23	13½	10	Harbour, Ireland	5 23	11½	8½
b., Nova Scotia	7 54	6½	4½	Slyne Hd., Ireland, W.C.	4 30	13¼	10
— (New Id.),	10 30			Smalls Lighthouse, St.	6 0	21	
ad Islands.				Georges Channel.			
l., Gulf St.	3 42	5½	3	Smerwick, Ireland -	3 50	11½	8
ce.				Smithville, United States	7 19	5½	4¼
Bay, Yellow Sea	1 30			Smoky Bay, Australia,	12 15	6	
, Australia, N.C.	6 0	18-25	14-20	S. Coast.			
— E. Coast -	8 30			Smyth Harbour, Tierra	12 0	6½	
ter B., Australia,	10 30	12-18		del Fuego.			
st.				Snape Bridge, Orford,	3 0	6	
l., England -	11 34	18	13½	England.			
, America, N.W.	1 0	13½		Sococa, France -	3 19	12½	8¾
				Socotra Id., Indian Ocean	7 20	8	
or West River,				Sofala R., Africa, E. Coast	4 0	19	
E. Coast:				Solovet Road, White Sea	5 0	4	
(San-shui) -			5-6	Solway (Tarn Point),	11 22	23	18
(Shao-king) -			3	Scotland.			
(Wachan) -			1-1½	Sosnovaia Bay, White Sea	2 40	6	
er, Malacca Strt.	9 0	12		Sosnovets, White Sea -	11 44	18	
ff the town -		11		Souma, White Sea -	6 30	5½	
Cape, Australia,	9 15	10		South Farallon, California	10 37	4½	3½
st.				South Rock, Ireland -	10 58	13	10½
one, Africa, W.C.	7 55	8		Southampton, England -	10 30	13	9½
L. (Bar), Sumatra	6 0	4½		— 12 45	7 30	4	
Japan Sea -	7 30	7		South West Bay, New			
Port, Japan Sea	5 0	3-5		Providence.			
ki, Japan Sea -	8 30	8	6	— Cape, N. Zealand	12 0	7	5
ay, Africa -	2 44	5½	3½	Southernness, England -	11 20	28	
t., Island, U.S.	7 43	8½	6½	Southwold, England -	10 20	6½	4½
, New Harbour,	9 45	10	7½	Spain, Port, Trinidad -	4 30	4	3
a Strait.				Spensers Anchorage, Bay	11 42	39	33
frica, W. Coast -	5 0	4		of Fundy.			
rdy Ids., Torres	9 15	10		Bay, Africa, S.W.	10 50	5-6	
E. Coast.				Coast.			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Spring
		Springs.	Neaps.			
	h. m.	ft.	ft.		h. m.	ft.
Spenser Gulf, (Thorny Passage,) Australia, S. Coast.	12 0	6-8		Swansea, (Mumbles Lighthouse), Wales.	6 1	27½
Spicers Cove, B. of Fundy	11 35	37	30½	Swift Bay, Australia, N. Coast.	12 0	21
Spider Id., China, E. C. -	10 0	17		Swona, E. side, Pentland Firth.	10 24	10
Spitzbergen (Bell Sound)	8 56	3½		W. side, Pentland Firth.	9 35	10
Spurn Pt. (Humber R.), England.	5 26	18½	15	Sydney, Australia, E. Cst.	8 38	4½
Staten Island, Tierra del Fuego.	4 30	8		Harb., Cape Breton	9 0	5
Staunton Id., Yellow Sea	1 30			Table Bay, Africa, W. Cst.	2 40	5
Stellacoom Fort, Oregon	4 46	11	9½	Tabou R., Africa, W. Cst.	4 45	3-4
Stephen Port, Australia, E. Coast.	9 0	6		Tabuai Island, S. Pacific		3
Falkland Islands.	7 45	7½		Tadeo, San, River, Patagonia, W. Coast.	11 45	6
Stewart Harbour, Tierra del Fuego.	2 50	4		Tahiti, S. Pacific	noon.	1½
Stirling, Firth of Forth, Scotland.	3 52	7½	4½	Tahri, Persian Gulf	5 0?	
Stirrup Cays, Bahamas	7 0	4		Taichow Ids., China, E. C.	9 0	14
Stockton (Tees), England	4 40	11		Tai-Tai Bay, China Sea, E. Coast.	9 30	5½
Stonehaven, Scotland	1 10	14	11	Talcahuano, Chile	10 14	5
Stonington, United States	9 7	3½	3	Talcan Island, Patagonia, W. Coast.	1 3	15½
Stornoway, Lewis Island, Scotland.	6 46	13	9½	Ta-lien-whan Bay, Yellow Sea.	10 10	12
Strangford (Killard Point), Ireland.	10 53	14	11½	Tam-Sui Harbour China Sea, E. Coast.	11 45	7-12
Quay	12 31	10½	8½	Tamar R., George Town, Tasmania.	11 15	12½
Head of Lough (Turley Rocks).	12 44	11½	9½	Launceston, Tasmania.	1 0	12½
Streaky Bay (Blancheport), Australia S. C.	1 0	5		Port, Magellan Strait.	3 5	5
Stroma, S. side, Pentland Firth.	9 47	9	6½	Tamatave, Madagascar, E. Coast.	4 18	8
Stromness, Orkneys	9 0	10	7½	Tampa Bay, United States	11 21	1½
Suadiva Atoll, Maldives	1 0	4		Tanabé, Ki Channel, Japan Sea.	6 0	6
Sual Port, Luzon		6		Tanera, Summer Islands, Scotland.	6 37	14
Suderoe Fiord, Færoe Islands.	6 0	9½	7½	Tangier, Africa, N. Coast	1 42	8
Suez Bay (head of Gulf), Red Sea.	2 0	6		Tangtang Harbour, Madagascar, E. Coast.	4 30	6
Sughrá, Arabia, S.E. Cst.	8 0	6		Tanjong Api, China Sea		7
Sumburgh Head, Shetland	9 45			Tanjong Bolus, Malacca Strait.	9 30	10½
Sunderland, England	3 22	14½	11	Tanna, New Hebrides	5 35	3
N., England	2 30	15	11½	Tappahannock, U States	0 42	2
Supé Bay, Peru	4 50	3		Tappanooly Harbour, Sumatra.	6 10	6
Surat, Hindoostan, W. C.	4 0	19		Taranaki or New Plymouth, New Zealand.	9 30	12
Surin, St., France	4 11	14½	11	Tarbert, Ireland	4 57	14½
Surinam, Guayana	6 0	5½		Tarifa, Spain	1 46	6
Sussex Port, Falkland Islands.	8 15	6		Tarn Pt., Solway, Scotland.	11 22	23
Sutton Pool, England	5 32	15½	11½	Tarpaulin Cove, United States.	8 4	2½
Sviatoi Nos, Lapland	9 15	14		Tarrytown, United States	9 57	4
Svineo Fiord, Færoe Ids.	12 0	6½	4½	Tatamagouche, Nova Scotia.	10 0	8
Swain Reefs, Australia E. Coast.	10 0	10				
Swan Id., Bass Strait	9 35	6				
River, Port Grey, Australia, W. Coast.	9 0	14				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Spring.	Neaps.			Spring.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
a Bay, Japan Sea	5 50	5		Tonning, Germany -	2 1	9	
a Harbour, New	7 10	6	4½	Tooniang Id., Bias Bay,	8 0		
id.				China, E. Coast.			
., (entrance) Bay	10 30	20		Torbay, England -	6 0	13½	10
agal, E. Coast.				Toro Point, Chile -	9 45		
ver (Bar), Scot-	2 6	16	14	Tortola, Virgin Islands -	8 30	1½	
				Tortugas, Florida, U. S.	9 56	1½	1
oo-bay, China	10 15	6		Tower Id., Galapagos -	?	?	
E. Coast.				Townshend Harb., Tierra	2 30	5	
os Road, Baly. (N.	5 0	6½		del Fuego.			
.)				Townshend Port, Oregon	3 49	5½	5
Harb., Ireland -	5 16	11½	8½	Tracadie, Prince Edward	7 0	3½	2
. (Bar), England -	3 45	15		Island.			
outh, England -	6 0	13	9½	Træ Islands, Norway -	11 45	7	
Wales -	6 0	27	20	Trawbreaga Lough, Ire-	6 10	11½	8½
é, Cape Verd Ids.,		8½	6	land.			
ta Cruz).				Tréguier, France -	5 32	25	18½
a, Azores -	12 32	4½		Trek Island, White Sea -	10 48	20	
rka R., Lapland -	7 20	12		Trepassey, Newfoundland	7 0	6½	5
elling (West),	8 40	6	5	Tréport, France -	11 9	27	21
erlands.				Tres Cruces Point, Pata-	1 15	16	
a, White Sea -	3 17	7		gonia, W. Coast.			
l, Africa, N. Coast	2 23	2½	1½	Triangles, Gulf of Mexico		1½	
(outside Shoals),	6 30	4	3½	Trincomalee Har., Ceylon,	8 18	2	1½
erlands.				S. Coast.			
y Sound, Australia,	10 45	12-18		Tringano R., G. of Siam,	8 0	7	
Coast.				China Sea, W. Coast.			
us St., Id., Africa	3 25	4½		Trinidad (Port Spain),	4 30	4	3
eson Id., New Zea-	11 30	8	6	Caribbee Islands.			
				Trinity Bay (Bull Id.)	7 22	3½	2
y Passage, Spencer	12 0	6-8		Newfoundland.			
t, Australia, S. C.				Opening, Great	9 15	7-12	
minde, Jutland -	3 34	2		Barrier Reefs.			
Hummock Island	10 30	10		Tristan d'Acunha, South		8	
side), Bass Strait.				Atlantic.			
Kings Islands, New	8 0	7		Triton Harb., New-	7 0?	2-4?	
land.				foundland.			
Points Cape, Africa,	4 0	4		Tromsø, Norway -	1 45	8	
Coast.				Troon, Scotland -	11 50	10	7½
Rivers, River St.	11 30	1		Troubridge Shoals, Aus-	3 30	6	
rence.				tralia S. Coast.			
s Point, U. S. -	11 20	9½	7½	Truro, England (Town	5 5	10	6
o, Scotland -	8 28	14½	11	Quay).			
Island, (Port San	6 30	6		Tsang-chow Id., Bias	8 30		
into) Filipinas.				Bay, China, E. Coast.			
Bay, Patagonia -	1 45	11		Tsau-liang-hai or Chosan	7 45	7	5
pak Harb., China,	12 0	8½		Harb., Japan Sea.			
t Coast.				Tsu-sima Sound, Yellow	8 30	8	
allier Bay, G. of	irr.	2		Sea.			
rico.				Tudwall, St., Road, Wales	7 45	14	
ae, Chusan, China,	11 0	12	9	Tumaco Road, Ecuador -	2 33	12	
Coast.				Tunis, Mediterranean -		3	
po, Caribbean Sea -	irr.	3½		Turna Bay, White Sea -	9 54	11	
mory, Isle of Mull	5 36	13	9½	Turner C., Prince Edwd.	6 10	4	2
Ali Point, Banka	8 30PM*			Island.			
nit.	10 0AM†	12		Turon B., Cochin China	3 0	4	
(Seto-uchi), Japan	11 0?		5	Tuticorin Harb., G. of	1 15	2½	1½
				Manar, Bay of Bengal,			
tabu, S. Pacific -	6 50	4		W. Coast.			
ang Harb., China,	11 30	12		Tutukaka Harbour, New	7 0	9	7
Coast.				Zealand.			

\* In S.E. monsoon.

† In N.W. monsoon.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Spring.	Neaps.			Spring.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Tweed River (Danger Point), Australia E.C.	9 45	5-8		Victoria R., Mosquito Flat, Australia, N.W. Coast.	12 19	15-24	2
Twofold B., Australia, E.C.	10 0	7	5	— Sandy Island, Australia, N.W. Coast.	1 17	3-10	
Tylatiap Harb. Java, S.C.	8 45	3½		— Turtle Pt., Australia, N.W. Coast.	7 15	7-13	
Tynemouth (Bar), England	3 20	14½	11	Vigo, Spain - - -	3 0	12-13	
Typa Anchorage, China, E. Coast.	10 0	7		Vin Harbour, G. St. Lawrence.	5 45	5	
Uist, North, Scotland, W. Coast.	6 10	11½	8½	Vincent, St., Cape, Madagascar, W. Coast.	4 45	12	
Ullapool, Loch Broom, Scotland.	6 40	14½	10½	— Port St., New Caledonia.	5 50	4½	
Ummen Nakheilah, Persian Gulf.	7 30?	8?		Virgin C., Magellan Strait.	8 30	36-42	
Underwood Port, New Zealand.	6 10	8	6	Vivero, Spain, N. Coast -	3 0	15	
Union Bay, La Plata -	3 10	12	9	Vladimir, St., Bay, G. of Tartary.	irr.	2	
Union, Port la, G. of Fonseca, Cent. America.	3 15	10½	8½	Volcano Ids., China, E. Coast.	11 30	15	1
Upernivik, Greenland -	11 0	8		Voronov C., White Sea -	11 20	17	
Upstart Cape, Australia, E. Coast.	11 0	6-8		Waagoe Fiord, Faeroe Ids.	6 0	9½	1
Urakami, Japan Sea -	7 30	6	5	Wahaay Harb. (Ceram), N. Coast, Moluccas.	6 0	3	
Uranouchi, Japan Sea -			5	Waikato R., New Zealand.	9 30	12	1
Urie Firth, Shetlands -	9 45	6½	5	Walker Creek, Choiseul Id., Falkland Ids.	6 20	5½	
Ursula Id., Palawan, China Sea, E. Coast.	11 0	7½		—, R. Tyne, England.		10½	
Ushant, France - -	3 32	19½	13½	Wallace Har., Nova Scotia	10 30	8	1
Ushrufi Islands, Red Sea	6 14	2		Wallis Id., Torres Strait	irr.	7	
Utria, New Granada -	4 0	12		Walvisch Bay, Africa, W. Coast.	1 54	6	
Værø, Norway - -	12 0	9	7½	Wanchew R. (entrance), China, E. Coast.	9 0	15½	
Valdivia Port, Chile -	10 35	5	8	— (City), China, E. Coast.	9 30	15½	
Valentia Harb., Ireland -	3 42	11		Wanganui R., New Zealand.	10 15	8	1
Valentine Harb., Magellan Strait.	2 0			— Inlet, New Zealand.	11 20	7	1
Valery St. en-Caux, France	10 46	27	21½	Wangari Harbour, New Zealand.	7 0	9	1
— sur-Somme, France.	11 46	27	21½	Wangaroa Harbour, New Zealand.	8 15	7	
Vallay, North Uist, Scotland, W. Coast.	6 10	11½	8½	Wangaruru Harbour, New Zealand.	7 10	9	1
Vallenar R., Patagonia, W. Coast.	0 18	5		Wapitagu Harb., G. of St. Lawrence.	10 30	5	1
Valparaiso, Chile -	9 32	5		Warleigh Quay, River Tavy, England.	5 47	14½	1
Vansittarts Saddle, Yellow Sea.	4 20	10	8½	Warnboro' Sd., Australia, W. Coast.		3-4	
Veere, Netherlands -	1 20	15		Warrenpoint, Carlingford, Ireland.	11 10	14½	1
Ventry, Ireland -	3 44	10½	7½	— Lough Foyle, Ireland.	6 20	6½	
Venus Harbour, Australia, S. Coast.	2 15	6		Watch Hill, United States	9 0	3	
Vera Cruz, G. of Mexico		2					
Verde C., Africa, W. C.	7 45	5					
Vermilion Bay, G. of Mexico.	irr.	2½	1½				
Vernon Chan. (Chusan Arch), China, E. Coast	9 40	14					
Versavah, Hindoostan, W. Coast.	12 15	16					
Verte Bay, Nova Scotia	10 0	9	5				
Victoria, Brazil - -	3 0	4					
— St. Juan de Fuca Strait.	irr.	7-10					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
ard (Bridge), Ire-	h. m. 6 6	ft. 13½	ft. 10½	Wisbeach Eye, England	h. m.	ft.	
ord (Duncannon	5 20	12½	10	Wivenhoe, Colne River, England.	12 10	15	10
o B., Africa, S. Cat.	4 0	6		Wolstenholm Sound, Arctic Regions.	11 8	7½	
lands, Tierra del	2 0	5		Woodbridge Haven (Bar), England.	11 45	12	9
i-wei Harbour,	9 30	9		(Kingston Quay), England.	0 35	10	
ow Sea.				Woodbridge, (Wilford Bridge), England.	0 55	7	
lead, R. Tamar, and.	6 17	5½	1½	Woodlark Id., Louisiade Archip.	7 15	4	
ne B., Patagonia, Coast.	0 50	7½		Woods Hole (entrance from Vineyard Sound), United States.	8 34	2	1½
ey Is., Australia, East.	7 30	8-12		(entrance from Buzzard Bay), United States.	7 59	4½	4
st, United States	11 5	13½	12	Woolwich, England -	1 37	18½	15½
England -	7 0	12		Workington, England -	11 4	20	15
lar, England -	6 20	18		Wrabness, Stour River, England.	12 29	12	
n Isles, Galapagos	2 10			Wranger Oog, Germany	12 0	9?	
outer light vessel), any.	11 30			Wrath Cape, Scotland -	7 30	15½	
ove, Kenmare R., and.	3 52	10	7½	Wreck Reef, Australia, E. Coast.	8 45	6-8	
at, Netherlands -	1 45	7		Wuchan, Si Kiang, China, East Coast.		1-1½	
ill, Australia, E. C.	10 20	24		Wusing River (entrance), Yang-tse-Kyang, China, E. Coast.	0 30	15	10½
Quoddy, Bay of y.	11 12	21	17	Wynkoops Bay, Java -	5 0	4½	4
river, China, E. t, see Si Kiang.				Yang-tse Kyang (entrance), China, E. Coast.	12 0	12	8
a Port, Australia, East.	1 10	8	6	Yarmouth Haven (Brush) England.		5½	4½
anshaven, Færoe	8 0	9½	7½	Bay of Fundy	10 9	16	13
ss, Orkneys -	9 11	10	7½	Bridge, England		5	4
super-mare, Eng-	6 54	37	28½	Road, England	9 15	6	4
ort, Ireland -	4 57	12½	9½	Isle of Wight, England.	10 0	7	6½
rd, Ireland -	7 21	5	3½	Yealm River, Bigbury Bay, England.	5 37	16½	11½
oa { In March -	1 40	7-8		Yedo Bay, (Yoku-hama) Japan.	6 0	6½	4½
o, { In April -	1 15			Yellaboi, Africa, West Coast.	7 10	10	
t { In May & June -	0 30			Yeu, Ile d', France -	3 6	14½	10
t note, p. 168.				Ylo Road, Peru -	8 15	6	
g, England -	3 45	15	11½	Yndependencia B., Peru	4 50	4	
Dog Ids., China, E. C.	9 0	18		Yoku-hama, Yedo Bay, Japan Sea.	6 0	6½	4½
aven, England -	11 14	23½	18½	York C., Australia, East Coast.	11 15	10	7
— Nova Scotia	8 0	6½	4½	— Factory, Hudson Bay	11 15	10-14	
Scotland -	11 22	10	7½	— River (Moody's Wharf), United States.	9 35	3½	
ow, Ireland -	10 29	9	6½	— Road, Magellan St.	2 0	9	
ay, Australia, E. C.	9 0	6-8		Youghal, Ireland -	5 14	12½	10
all, Orkneys -	9 3	10	7½				
o Frt., Falkland Ids.	5 15	7	5½				
— New Zealand	12 45	8	6				
ghby Cape, Kan-	4 10	6					
gton, United States	9 6	3	2½				
romontory, Aus-	2 0	10					
S. Coast.							
Harb., Melville Id.	1 30	3½					
n Ridge, England	7 50						
b, England -	7 30	15					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Yung R., Chinhae, China, E. Coast.	h. m. 11 20	ft. 12½	ft.	Zansibar, Africa, E.C. - (Channel)	h. m. 5 20 4 15	ft. 10 11	
Ning-po-fu, China, E. Coast.	1 0	9		Africa, E. Coast.			
Yung-hing Bay, Japan S.	5 20	2½		Zebú Port, Filipinas -	12 0	7	
Yura Harbour, Japan Sea	6 5	6½		Zeyla, Africa, E. Coast	7 15	8½	
				Zieriksee, Netherlands -	2 0	11	

LONDON :

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For Her Majesty's Stationery Office.

# TIDE TABLES

FOR THE

## BRITISH AND IRISH PORTS,

FOR THE YEAR

1864;

ALSO THE TIMES AND HEIGHTS OF HIGH WATER AT FULL AND CHANGE  
FOR THE PRINCIPAL PLACES ON THE GLOBE.

COMPUTED BY JOHN BURDWOOD, STAFF COMMANDER, R.N.

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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*Price One Shilling and Sixpence.*

1863.



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N-SUPER-MARE	7	15	23	31	39	47	55	63	71	79	87	95

## NOTICE.

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If it be desired to reduce the Mean Time at any Place to that of Greenwich (or Railway) Time, (which latter is used in the Tide Tables, published in Liverpool and Glasgow,) the following correction must be applied to the Time given in these Tables :—

	Minutes.
Brest - - -	+ 18
Devonport - -	+ 17
Portsmouth - -	+ 4
Dover - - -	- 5
Sheerness - -	- 3
Harwich - - -	- 5
Hull - - -	+ 1
Sunderland - -	+ 5
North Shields -	+ 6
Leith - - -	+ 13
Thurso - - -	+ 14
Greenock - - -	+ 19
Liverpool - -	+ 12
Pembroke - - -	+ 20
Weston-super-mare -	+ 12
Holyhead - - -	+ 18

For the Irish Ports, should Dublin Mean Time be required, the following correction must be applied to the time given in these Tables :—

	Minutes.
Kingstown - - -	- 1
Belfast - - -	- 2
Londonderry. - -	+ 4
Sligo - - -	+ 9
Galway - - -	+ 11
Queenstown (Cork) -	+ 8
Waterford - - -	+ 3

The above corrections are also given at the foot of each page under the place for which the times and heights of high water are predicted.

## ADVERTISEMENT.

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In the following Tables the time of High Water is given to *Mean* time at Place. Those who are desirous of knowing the *Apparent* time, (or that shown by the Sun,) at which High Water occurs, must apply the equation of time, by addition or subtraction, as directed for that purpose.

The height of the tide in these Tables is calculated from the mean level of the low water of ordinary springs, because the soundings expressed in most charts are reduced to that level. The height therefore which is given at each place is the actual rise of high water above the mean low-water level of spring-tides.

In the column of the Moon's transit, (m) stands for morning, and (a) for afternoon.

The Moon's age is given in days, and tenths of a day, from the time of her conjunction, or change; thus, it is New Moon on the 6th of April, at 1 h. 49 m. in the afternoon, and therefore, on the 7th of April, at noon, the moon being 22 h. 11 m. old, her age may be accounted as nine tenths of a day, and is expressed by 0.9.

The highest equinoctial tides take place, on the west coast of Ireland and on the south coast of England, three transits after the New and Full Moon, unless diverted by gales of wind or other extraordinary causes. Along the east coast of England, they take place four transits after the New and Full Moon. In the river Thames they occur five transits after the same epoch. These differences arise from the cause, that the same tide-wave which produces high water on the west coast of Ireland takes half a day in its progress from thence to the east coast of England, and a whole day before it arrives in the river Thames.

The time of high water at Brest is added for the benefit of vessels navigating the north coast of France and the adjacent sea.

Immediately after the Tide Tables, at page 98, will be found a convenient method of deducing, from them, the height of the tide at any intermediate hour, between high and low water.

The next Table, at page 101, shows the depths on the dock-sills at Falmouth, Devonport, Plymouth, Portsmouth, Sheerness, Chatham, Woolwich, Deptford, London, Hull, Middlesbrough, Hartlepool, Sunderland, Leith, Pembroke, Liverpool, Birkenhead, Dublin, and Londonderry.

In page 103 will be found a collection of Constant Differences, by which the time and height of high water at certain other ports may be approximately found. If the authorities at the different ports would transmit to the Admiralty six months' observations (at least) of the times and heights of high and low water, these Constants might be usefully increased.

In page 108 a description is given of the general set of the tides in the neighbourhood of several parts of the coast, including a full account of the streams among the Orkneys, and through the Pentland Firth, by Com. F. W. L. Thomas, R. N. And, the development, by Rear-Admiral F. W. Beechey, of the movement of the great tide-wave up the English and Irish Channels, and into the North Sea; to which has been added a description of the set of the tides in the vicinity of Rathlin Island on the north coast of Ireland by Richard Hoskyn, Staff Commander, R. N.

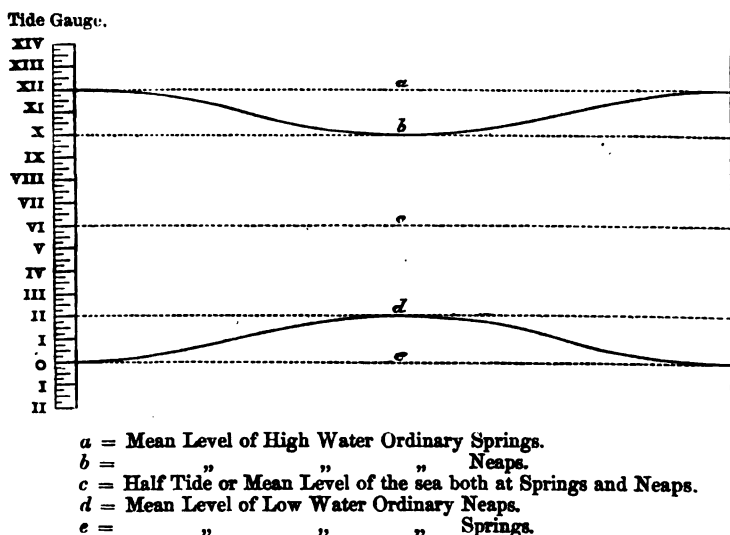
Lastly, there is appended the time of high water on the days of Full and Change at various places on the globe arranged according to the apparent progress of the tide-wave, and also alphabetically; with the rise of the tide at springs and neaps.



The stations at the several ports where the tidal observations were made on which the predictions in these tables are based, are as follows,—viz :—

Brest, entrance of the basin—Devonport, Dockyard—Portsmouth, Dockyard—Dover, North Pier—Sheerness, Dockyard—London Docks (reduced to London Bridge, the latter being given in these tables, by applying to the times at the docks + 10<sup>m</sup> to the heights - 4<sup>ins</sup>)—Harwich, Angel Quay—Hull, Victoria Dock—Sunderland, North Dock—North Shields, Low Lighthouse—Leith, East Pier—Thurso, 1st Pier—Scrabster Pier—Greenock, East Dock—Liverpool, St. Georges Pier—Pembroke, Dockyard—Weston-super-mare, Bairnbach Island—Holyhead, Pier—Kingston, Watering Pier—Belfast, New Dock—Londonderry, Ship Bridge—Sligo Bay, Mill Pier—Loughmore—Galway, Nimmos Pier—Queenstown, Scott's Wharf—Waterford, Docks—Cannon Fort.

The following diagram is intended to explain the terms Spring Rise, Neap I and Neap Range as made use of on the Admiralty Charts and in the Sailing Directions published by the Admiralty :—



**Example.**

Spring Rise (or Mean Spring Range)	=	$e$ to $a$	=	12	ft.
Neap Rise	-	-	=	$e$ to $b$	= 10
Neap Range	-	-	=	$d$ to $b$	= 8

**TIDE TABLES**  
**FOR THE**  
**BRITISH AND IRISH PORTS**  
**FOR THE YEAR**  
**1864.**

## TIDE TABLES FOR THE

JANUARY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.				DEVONPORT.				PORTSMOUTH.							
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTER.					
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.				
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.				
F.	1	5 m 4	7 51	15 1	8 12	14 8	9 28	12 11	9 49	12 4	3 31	11 0	3 49					
S.	2	5 47	8 37	14 3	9 3	14 0	10 11	12 6	10 37	12 1	4 9	10 8	4 34					
♄	3	6 33	9 34	13 10	10 10	13 10	11 3	12 2	11 34	12 0	4 59	10 3	5 28					
M.	4	7 22	10 47	13 11	11 25	14 1	—	—	0 14	12 2	6 2	10 1	6 36					
Tu.	5	8 15	—	—	0 3	14 6	0 52	12 3	1 30	12 6	7 14	10 2	7 50					
W.	6	9 12	0 38	15 0	1 10	15 8	2 8	12 11	2 45	13 3	8 27	10 10	9 1					
Th.	7	10 12	1 41	16 6	2 7	17 3	3 19	13 11	3 51	14 1	9 33	11 7	10 2					
F.	8	11 14	2 32	18 0	2 57	18 10	4 20	14 10	4 48	14 9	10 28	12 3	10 53					
S.	9	0 a 16	3 23	19 6	3 48	19 11	5 15	15 8	5 41	15 6	11 19	12 10	11 44					
♄	10	1 16	4 13	20 3	4 38	20 6	6 7	16 3	6 33	15 10	—	—	0 9					
M.	11	2 13	5 0	20 8	5 24	20 8	6 57	16 8	7 20	16 0	0 35	13 4	0 59					
Tu.	12	3 7	5 47	20 5	6 10	20 1	7 43	16 7	8 6	15 9	1 24	13 5	1 48					
W.	13	3 59	6 33	19 8	6 56	19 0	8 30	16 2	8 52	15 3	2 11	13 2	2 34					
Th.	14	4 50	7 18	18 4	7 41	17 6	9 11	15 5	9 31	14 7	2 57	12 8	3 19					
F.	15	5 40	8 5	16 8	8 30	15 11	9 53	14 6	10 15	13 9	3 41	12 1	4 3					
S.	16	6 30	8 56	15 2	9 24	14 6	10 39	13 5	11 4	13 0	4 27	11 4	4 53					
♄	17	7 20	9 58	14 2	10 38	13 10	11 32	12 7	—	—	5 19	10 6	5 51					
M.	18	8 10	11 19	13 8	—	—	0 6	12 5	0 44	12 3	6 29	10 0	7 8					
Tu.	19	9 0	0 1	13 9	0 38	13 11	1 22	12 4	2 0	12 4	7 48	10 1	8 27					
W.	20	9 50	1 13	14 3	1 44	14 9	2 35	12 9	3 9	12 8	9 4	10 6	9 36					
Th.	21	10 39	2 8	15 3	2 31	15 10	3 42	13 5	4 9	13 3	10 2	11 0	10 26					
F.	22	11 26	2 51	16 4	3 10	16 11	4 35	14 1	4 57	13 9	10 47	11 5	11 6					
S.	23	morn.	3 30	17 3	3 48	17 6	5 19	14 7	5 39	14 11	11 26	11 9	11 44					
♄	24	0 12	4 4	17 9	4 21	17 11	5 56	14 11	6 14	14 8	12 0	12 0	—					
M.	25	0 55	4 37	18 1	4 52	18 2	6 31	15 2	6 48	14 6	0 17	12 1	0 34					
Tu.	26	1 38	5 7	18 3	5 22	18 2	7 3	15 2	7 16	14 5	0 51	12 2	1 7					
W.	27	2 20	5 38	18 1	5 52	17 11	7 31	14 11	7 46	14 3	1 23	12 2	1 38					
Th.	28	3 2	6 8	17 9	6 23	17 7	8 0	14 6	8 16	13 11	1 53	12 1	2 8					
F.	29	3 45	6 40	17 2	6 58	16 9	8 33	14 1	8 47	13 7	2 24	11 11	2 41					
S.	30	4 29	7 17	16 3	7 38	15 9	9 1	13 6	9 19	13 2	2 59	11 7	3 18					
♄	31	5 15	8 0	15 2	8 24	14 8	9 39	13 0	9 59	12 8	3 38	11 2	3 57					
Half Mean Spring Range.			9 ft. 6 in.				7 ft. 9 in.				6 ft. 4 in.							
Phases of the Moon.							Moon's Declination at Noon.											
D. H. M.							M. D.	°	'	M. D.	°	'	M. D.	°	'	M. D.	°	'
Last Quarter - 2 7 39 Morning.							1	4 S. 22	9	17 S. 42	17	17 N. 18	25					
New - - - - - 9 7 46 Morning.							2	8 35	10	14 4	18	19 31	26					
First Quarter - 15 11 6 Afternoon.							3	12 33	11	9 32	19	20 45	27					
Full - - - - - 23 10 2 Afternoon.							4	16 3	12	4 29	20	20 59	28					
							5	18 49	13	0 N. 42	21	20 14	29					
In Perigee - - 10 2 0 Morning.							6	20 34	14	5 42	22	18 35	30					
In Apogee - - 24 9 0 Afternoon.							7	21 3	15	10 16	23	16 8	31					
							8	20 5	16	14 11	24	13 2						

The times of High Water are given for Mean Time at Place ; if Greenwich or Railway Time be requi

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 4 m.

## JANUARY, 1864.

DOVER.						SHEERNESS.						LONDON.						C's AGE AT NOON.					
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.							
H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	D.						
3 13 16 2	3 30 15 10		4 43 14 2	5 3 14 0		6 15 17 4	6 34 17 1		3 13 16 2	3 30 15 10		4 43 14 2	5 3 14 0		6 15 17 4	6 34 17 1	12 1 7						
3 50 15 7	4 13 15 2		5 23 13 9	5 45 13 7		6 54 16 10	7 16 16 7		3 50 15 7	4 13 15 2		5 23 13 9	5 45 13 7		6 54 16 10	7 16 16 7	1 1 7						
4 37 14 10	5 4 14 7		6 12 13 4	6 41 13 2		7 40 16 5	8 8 16 2		4 37 14 10	5 4 14 7		6 12 13 4	6 41 13 2		7 40 16 5	8 8 16 2	2 23 7						
5 34 14 6	6 5 14 6		7 14 13 1	7 51 13 1		8 42 16 0	9 17 15 11		5 34 14 6	6 5 14 6		7 14 13 1	7 51 13 1		8 42 16 0	9 17 15 11	11 24 7						
6 40 14 9	7 16 15 1		8 28 13 2	9 5 13 5		9 53 15 11	10 30 16 1		6 40 14 9	7 16 15 1		8 28 13 2	9 5 13 5		9 53 15 11	10 30 16 1	12 25 7						
7 53 15 7	8 26 16 2		9 41 13 9	10 15 14 2		11 9 16 3	11 44 16 7		7 53 15 7	8 26 16 2		9 41 13 9	10 15 14 2		11 9 16 3	11 44 16 7	7 26 7						
8 56 16 9	9 25 17 4		10 45 14 6	11 15 14 11		—	0 15 17 7		8 56 16 9	9 25 17 4		10 45 14 6	11 15 14 11		—	0 15 17 7	0 27 7						
9 52 17 10	10 19 18 5		11 40 15 3	—		0 44 17 5	1 10 17 11		9 52 17 10	10 19 18 5		11 40 15 3	—		0 44 17 5	1 10 17 11	11 28 7						
10 47 18 11	11 15 19 3		0 5 15 8	0 30 16 1		1 37 18 4	2 2 18 10		10 47 18 11	11 15 19 3		0 5 15 8	0 30 16 1		1 37 18 4	2 2 18 10	10 1 2						
11 42 19 7	—		0 56 16 4	1 21 16 8		2 26 19 3	3 51 19 7		11 42 19 7	—		0 56 16 4	1 21 16 8		2 26 19 3	3 51 19 7	7 1 2						
0 9 19 10	0 34 20 0		1 45 16 10	2 9 16 11		3 15 19 11	4 39 20 1		0 9 19 10	0 34 20 0		1 45 16 10	2 9 16 11		3 15 19 11	4 39 20 1	1 2 2						
0 59 20 0	1 26 19 11		2 32 16 11	2 55 16 11		4 120 2	5 12 19 10		0 59 20 0	1 26 19 11		2 32 16 11	2 55 16 11		4 120 2	5 12 19 10	2 3 2						
1 50 19 8	2 14 19 4		3 17 16 10	3 40 16 7		5 20 2	6 12 19 10		1 50 19 8	2 14 19 4		3 17 16 10	3 40 16 7		5 20 2	6 12 19 10	3 4 2						
2 37 18 11	3 0 18 5		4 3 16 3	4 26 15 11		6 19 18 10	7 57 19 3		2 37 18 11	3 0 18 5		4 3 16 3	4 26 15 11		6 19 18 10	7 57 19 3	3 5 2						
3 22 17 9	3 44 17 2		4 49 15 6	5 11 15 1		7 6 17 10	8 42 18 4		3 22 17 9	3 44 17 2		4 49 15 6	5 11 15 1		7 6 17 10	8 42 18 4	4 6 2						
4 8 16 6	4 32 15 10		5 37 14 8	6 3 14 3		8 32 16 6	9 17 15 11		4 8 16 6	4 32 15 10		5 37 14 8	6 3 14 3		8 32 16 6	9 17 15 11	4 7 2						
4 56 15 3	5 25 14 9		6 32 13 10	7 3 13 5		9 9 16 2	10 25 15 10		4 56 15 3	5 25 14 9		6 32 13 10	7 3 13 5		9 9 16 2	10 25 15 10	6 8 2						
5 59 14 6	6 34 14 4		7 39 13 3	8 20 13 2		10 25 15 10	11 4 15 10		5 59 14 6	6 34 14 4		7 39 13 3	8 20 13 2		10 25 15 10	11 4 15 10	9 9 2						
7 14 14 6	7 53 14 9		9 0 13 2	9 39 13 4		11 4 15 10	—		7 14 14 6	7 53 14 9		9 0 13 2	9 39 13 4		11 4 15 10	—	10 10 2						
8 29 15 0	8 59 15 5		10 15 13 6	10 49 13 9		—	—		8 29 15 0	8 59 15 5		10 15 13 6	10 49 13 9		—	—	11 1 2						
9 25 15 9	9 49 16 2		11 18 14 0	11 42 14 3		0 15 16 1	0 44 16 4		9 25 15 9	9 49 16 2		11 18 14 0	11 42 14 3		0 15 16 1	0 44 16 4	4 12 2						
10 11 16 6	10 33 16 10		—	0 4 14 6		1 10 16 8	1 33 17 0		10 11 16 6	10 33 16 10		—	0 4 14 6		1 10 16 8	1 33 17 0	5 13 2						
10 54 17 1	11 14 17 4		0 24 14 9	0 43 14 11		1 55 17 3	2 14 17 7		10 54 17 1	11 14 17 4		0 24 14 9	0 43 14 11		1 55 17 3	2 14 17 7	7 0 2						
11 33 17 6	11 50 17 8		1 3 15 1	1 21 15 3		2 33 17 10	2 50 18 1		11 33 17 6	11 50 17 8		1 3 15 1	1 21 15 3		2 33 17 10	2 50 18 1	11 15 2						
—	0 7 17 10		1 37 15 5	1 53 15 6		3 6 18 3	3 23 18 5		—	0 7 17 10		1 37 15 5	1 53 15 6		3 6 18 3	3 23 18 5	5 16 2						
0 25 17 11	0 41 18 0		2 9 15 7	2 23 15 7		3 39 18 7	3 53 18 8		0 25 17 11	0 41 18 0		2 9 15 7	2 23 15 7		3 39 18 7	3 53 18 8	8 17 2						
0 58 18 0	1 15 18 0		2 39 15 7	2 54 15 7		4 9 18 8	4 24 18 8		0 58 18 0	1 15 18 0		2 39 15 7	2 54 15 7		4 9 18 8	4 24 18 8	8 18 2						
1 31 17 11	1 48 17 9		3 8 15 6	3 22 15 5		4 39 18 8	4 55 18 7		1 31 17 11	1 48 17 9		3 8 15 6	3 22 15 5		4 39 18 8	4 55 18 7	7 19 2						
2 4 17 8	2 22 17 5		3 37 15 3	3 53 15 1		5 11 18 5	5 26 18 3		2 4 17 8	2 22 17 5		3 37 15 3	3 53 15 1		5 11 18 5	5 26 18 3	3 20 2						
2 41 17 1	3 0 16 9		4 10 14 11	4 28 14 8		5 43 18 1	5 59 17 10		2 41 17 1	3 0 16 9		4 10 14 11	4 28 14 8		5 43 18 1	5 59 17 10	10 21 2						
3 19 16 4	3 38 15 11		4 48 14 4	5 8 14 1		6 18 17 7	6 37 17 3		3 19 16 4	3 38 15 11		4 48 14 4	5 8 14 1		6 18 17 7	6 37 17 3	3 22 2						
Mean Spring Range.						9ft. 4in.						8ft. 0in.						9ft. 7in.					

## Equation of Time at Noon.

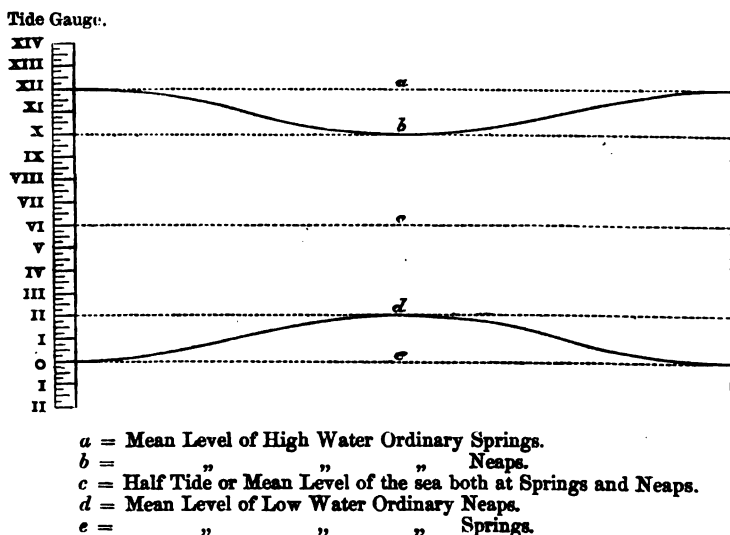
M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
3 38	Sub.	9	7 14	Sub.	17	10 16	Sub.	25	12 32	Sub.
4 6		10	7 39		18	10 35		26	12 45	
4 34		11	8 3		19	10 54		27	12 58	
5 2		12	8 27		20	11 12		28	13 10	
5 29		13	8 50		21	11 30		29	13 21	
5 56		14	9 12		22	11 46		30	13 31	
6 22		15	9 34		23	12 2		31	13 41	
6 48		16	9 55		24	12 17				

as of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m.      SHEERNESS subtract 5 m.      LONDON 0 m.

The stations at the several ports where the tidal observations were made on which the predictions in these tables are based, are as follows,—viz :—

Brest, entrance of the basin—Devonport, Dockyard—Portsmouth, Dockyard—Dover, North Pier—Sheerness, Dockyard—London Docks (reduced to London Bridge the latter being given in these tables, by applying to the times at the docks  $+10^m$  to the heights  $-4^{\text{ins}}$ )—Harwich, Angel Quay—Hull, Victoria Dock—Sunderland North Dock—North Shields, Low Lighthouse—Leith, East Pier—Thurso, a Scrabster Pier—Greenock, East Dock—Liverpool, St. Georges Pier—Pembroke Dockyard—Weston-super-mare, Bairnbach Island—Holyhead, Pier—Kingstown Watering Pier—Belfast, New Dock—Londonderry, Ship Bridge—Sligo Bay, Malghmore—Galway, Nimmos Pier—Queenstown, Scott's Wharf—Waterford, D cannon Fort.

The following diagram is intended to explain the terms Spring Rise, Neap R and Neap Range as made use of on the Admiralty Charts and in the Sailing Directions published by the Admiralty :—



*Example.*

	ft.
Spring Rise (or Mean Spring Range) = $e$ to $a$	12
Neap Rise - - - = $e$ to $b$	10
Neap Range - - - = $d$ to $b$	8

**TIDE TABLES**  
**FOR THE**  
**BRITISH AND IRISH PORTS**  
**FOR THE YEAR**  
**1864.**

## JANUARY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTER.			
			Time.	Height.	H.	M.	F.	I.	Time.	Height.	H.	M.	F.	I.	Time.	Height.	H.	M.	F.	I.	Time.	Height.	H.	M.	F.	I.
F.	1	5 m 4	3 55	8 11			4 13	8 9	3 5	22	0		3 24	21 7	10 11	17	3		10 30							
S.	2	5 47	4 34	8 8			4 58	8 7	3 45	21	2		4 12	20 9	10 51	16	4		11 13							
S.	3	6 33	5 24	8 5			5 54	8 4	4 40	20	4		5 14	20 11	11 40	15	8		—							
M.	4	7 22	6 28	8 3			7 2	8 3	5 51	20	1		6 30	20 3	0 10	15	7		0 43							
Tu.	5	8 15	7 39	8 3			8 15	8 5	7 9	20	8		7 44	21 2	1 23	15	10		2 4							
W.	6	9 12	8 50	8 7			9 23	8 10	8 19	21	10		8 48	22 7	2 42	16	10		3 18							
Th.	7	10 12	9 54	9 0			10 22	9 3	9 17	23	5		9 42	24 3	3 51	18	5		4 22							
F.	8	11 14	10 49	9 5			11 16	9 7	10 6	25	0		10 31	25 8	4 51	19	11		5 20							
S.	9	0 a 16	11 44	9 9			—	—	10 57	26	3		11 23	26 10	5 49	21	2		6 15							
S.	10	1 16	0 11	9 11			0 37	10 11	11 48	27	4		—	—	6 40	22	2		7 4							
M.	11	2 13	1 2	10 2			1 26	10 3	0 13	27	7		0 37	27 9	7 27	22	7		7 51							
Tu.	12	3 7	1 50	10 3			2 13	10 3	1 1	27	9		1 24	27 6	8 14	22	4		8 38							
W.	13	3 59	2 36	10 2			2 59	10 0	1 47	27	0		2 9	26 5	9 12	1	6		9 24							
Th.	14	4 50	3 21	9 10			3 42	9 8	2 31	25	9		2 53	25 1	9 44	20	3		10 4							
F.	15	5 40	4 4	9 6			4 27	9 3	3 15	24	3		3 38	23 5	10 25	18	10		10 47							
S.	16	6 30	4 52	9 1			5 17	8 10	4 3	22	6		4 32	21 8	11 9	17	2		11 32							
S.	17	7 20	5 44	8 7			6 17	8 5	5 2	20	11		5 39	20 6	—	—			0 1							
M.	18	8 10	6 55	8 3			7 33	8 2	6 21	20	2		7 3	20 1	0 36	15	7		1 16							
Tu.	19	9 0	8 13	8 2			8 50	8 3	7 42	20	3		8 19	20 7	2 1	15	6		2 42							
W.	20	9 50	9 26	8 5			9 57	8 6	8 52	21	0		9 21	21 6	3 20	16	1		3 53							
Th.	21	10 39	10 23	8 8			10 46	8 9	9 44	22	1		10 6	22 7	4 21	17	2		4 46							
F.	22	11 26	11 8	8 10			11 30	8 11	10 26	23	1		10 44	23 5	5 11	18	3		5 34							
S.	23	morn.	11 51	9 0			—	—	11 4	23	9		11 22	24 1	5 55	19	0		6 14							
S.	24	0 12	0 10	9 2			0 28	9 3	11 40	24	5		11 56	24 8	6 32	19	7		6 48							
M.	25	0 55	0 44	9 4			1 1	9 5	—	—			0 13	24 10	7 4	20	0		7 19							
Tu.	26	1 38	1 18	9 5			1 34	9 6	0 28	25	0		0 44	25 0	7 34	20	1		7 50							
W.	27	2 20	1 49	9 6			2 4	9 6	1 0	25	0		1 15	24 11	8 4	20	0		8 19							
Th.	28	3 2	2 18	9 6			2 34	9 5	1 29	24	8		1 44	24 5	8 35	19	8		8 51							
F.	29	3 45	2 50	9 4			3 7	9 3	1 59	24	1		2 16	23 9	9 8	19	1		9 25							
S.	30	4 29	3 23	9 2			3 47	9 1	2 34	23	3		2 52	22 10	9 43	18	3		10 1							
S.	31	5 15	4 2	8 11			4 21	8 10	3 12	22	3		3 32	21 8	10 19	17	4		10 41							
Half Mean Spring Range.			4 ft. 10 in.								13 ft. 0 in.								10 ft. 6 in.							
Phases of the Moon.												Moon's Declination at Noon.														
			D	H.	M.							M.D.	0	1	M.D.	0	1	M.D.	0	1	M.D.	0	1			
Last Quarter -			2	7	39	Morning.						1	4	8.22	9	17	8.42	17	17	N.18			25			
New - - - - -			9	7	46	Morning.						2	8	35	10	14	4	18	19	31			26			
First Quarter -			15	11	6	Afternoon.						3	12	33	11	9	32	19	20	45			27			
Full - - - - -			23	10	2	Afternoon.						4	16	3	12	4	29	20	20	59			28			
												5	18	49	13		N.42	21	20	14			29			
In Perigee - -			10	2	0	Morning.						6	20	34	14	5	42	22	18	35			30			
In Apogee - -			24	9	0	Afternoon.						7	21	3	15	10	16	23	16	8			31			
												8	20	5	16	14	11	24	13	2						

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m. | LIVERPOOL add 13 m. | PEMBROKE add 20 m.

## JANUARY, 1864.

DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	
3 16 2		3 30 15 10		4 43 14 2		5 3 14 0		6 15 17 4		6 34 17 1	21 7	
0 15 7		4 13 15 2		5 23 13 9		5 45 13 7		6 54 16 10		7 16 16 7	0	
7 14 10		5 4 14 7		6 12 13 4		6 41 13 2		7 40 16 5		8 8 16 2	23 7	
4 14 6		6 5 14 6		7 14 13 1		7 51 13 1		8 42 16 0		9 17 15 11	24 7	
0 14 9		7 16 15 1		8 28 13 2		9 5 13 5		9 53 15 11		10 30 16 1	25 7	
3 15 7		8 26 16 2		9 41 13 9		10 15 14 2		11 9 16 3		11 44 16 7	26 7	
6 16 9		9 25 17 4		10 45 14 6		11 15 14 11		—		0 15 17 0	27 7	
2 17 10		10 19 18 5		11 40 15 3		—		0 44 17 5		1 10 17 11	28 7	
7 18 11		11 15 19 3		0 5 15 8		0 30 16 1		1 37 18 4		2 2 18 10	0	
2 19 7		—		0 56 16 4		1 21 16 8		2 26 19 3		2 51 19 7	1 2	
9 19 10		0 34 20 0		1 45 16 10		2 9 16 11		3 15 19 11		3 39 20 1	2 2	
9 20 0		1 26 19 11		2 32 16 11		2 55 16 11		4 1 20 2		4 25 20 2	3 2	
0 19 8		2 14 19 4		3 17 16 10		3 40 16 7		4 50 20 1		5 12 19 10	4 2	
7 18 11		3 0 18 5		4 3 16 3		4 26 15 11		5 34 19 7		5 57 19 3	5 2	
12 17 9		3 44 17 2		4 49 15 6		5 11 15 1		6 19 18 10		6 42 18 4	0	
8 16 6		4 32 15 10		5 37 14 8		6 3 14 3		7 6 17 10		7 30 17 4	7 2	
56 15 3		5 25 14 9		6 32 13 10		7 3 13 5		7 59 16 11		8 32 16 6	8 2	
59 14 6		6 34 14 4		7 39 13 3		8 20 13 2		9 9 16 2		9 46 15 11	9 2	
14 14 6		7 53 14 9		9 0 13 2		9 39 13 4		10 25 15 10		11 4 15 10	10 2	
29 15 0		8 59 15 3		10 15 13 6		10 49 13 9		11 43 15 11		—	11 2	
25 15 9		9 49 16 2		11 18 14 0		11 42 14 3		0 15 16 1		0 44 16 4	12 2	
11 16 6		10 33 16 10		—		0 4 14 6		1 10 16 8		1 33 17 0	13 2	
54 17 1		11 14 17 4		0 24 14 9		0 43 14 11		1 55 17 3		2 14 17 7	0	
33 17 6		11 50 17 8		1 3 15 1		1 21 15 3		2 33 17 10		2 50 18 1	15 2	
—		0 7 17 10		1 37 15 5		1 53 15 6		3 6 18 3		3 23 18 5	16 2	
25 17 11		0 41 18 0		2 9 15 7		2 23 15 7		3 39 18 7		3 53 18 8	17 2	
58 18 0		1 15 18 0		2 39 15 7		2 54 15 7		4 9 18 8		4 24 18 8	18 2	
31 17 11		1 48 17 9		3 8 15 6		3 22 15 5		4 39 18 8		4 55 18 7	19 2	
4 17 8		2 22 17 5		3 37 15 3		3 53 15 1		5 11 18 5		5 26 18 3	20 2	
41 17 1		3 0 16 9		4 10 14 11		4 28 14 8		5 43 18 1		5 59 17 10	21 2	
19 16 4		3 38 15 11		4 48 14 4		5 8 14 1		6 18 17 7		6 37 17 3	22 2	
Mean Spring Range.		9ft. 4in.		8ft. 0in.		9ft. 7in.						

## Equation of Time at Noon.

H. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
3 38		9	7 14		17	10 16		25	12 32	
4 6		10	7 39		18	10 35		26	12 45	
4 34		11	8 3		19	10 54		27	12 58	
5 2		12	8 27		20	11 12		28	13 10	
5 29		13	8 50		21	11 30		29	13 21	
5 56		14	9 12		22	11 46		30	13 31	
6 22		15	9 34		23	12 2		31	13 41	
6 48		16	9 55		24	12 17				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. SHEERNESS subtract 3 m. LONDON 0 m.



## JANUARY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.						
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.			
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.			
F.	1	5m 4	2 49	8 6	3 9	8 5	—	—	0 19	5 10	9 32	8 9	9 57	—			
S.	2	5 47	3 32	8 4	3 59	8 3	0 48	5 8	1 23	5 7	10 27	8 6	10 57	—			
W.	3	6 33	4 27	8 2	4 59	8 1	1 58	5 7	2 35	5 7	11 31	8 4	—	—			
M.	4	7 22	5 32	8 1	6 5	8 1	3 10	5 9	3 42	5 11	0 5	8 4	0 39	—			
Tu.	5	8 15	6 41	8 1	7 16	8 2	4 14	6 1	4 42	6 4	1 15	8 7	1 49	—			
W.	6	9 12	7 49	8 4	8 18	8 6	5 8	6 6	5 32	6 9	2 22	9 1	2 50	—			
Th.	7	10 12	8 46	8 9	9 12	9 0	5 57	6 11	6 22	7 2	3 17	9 10	3 41	—			
F.	8	11 14	9 37	9 3	10 2	9 5	6 47	7 5	7 14	7 7	4 10	7 4	4 28	—			
S.	9	0a 16	10 27	9 7	10 52	9 8	7 41	7 10	8 6	8 0	4 54	11 4	5 20	—			
W.	10	1 16	11 16	9 9	11 38	9 9	8 29	8 2	8 50	8 3	5 45	11 10	6 8	—			
M.	11	2 13	11 59	9 10	—	—	9 12	8 3	9 35	8 2	6 30	11 11	6 55	—			
Tu.	12	3 7	0 25	9 10	0 51	9 9	9 57	8 0	10 19	7 10	7 20	11 8	7 43	—			
W.	13	3 59	1 15	9 8	1 40	9 7	10 42	7 8	11 5	7 5	8 5	11 0	8 28	—			
Th.	14	4 50	2 6	9 5	2 32	9 3	11 30	7 1	12 0	6 9	8 52	10 4	9 16	—			
F.	15	5 40	2 57	9 1	3 23	8 10	—	—	0 32	6 5	9 46	9 7	10 15	—			
S.	16	6 30	3 50	8 8	4 19	8 6	1 7	6 2	1 44	6 0	10 47	8 11	11 20	—			
W.	17	7 20	4 49	8 4	5 22	8 2	2 22	5 10	2 59	5 9	11 55	8 6	—	—			
M.	18	8 10	5 58	8 1	6 35	8 0	3 36	5 10	4 9	5 11	0 32	8 5	1 9	—			
Tu.	19	9 0	7 14	8 0	7 50	8 0	4 42	6 0	5 11	6 1	1 47	8 5	2 22	—			
W.	20	9 50	8 23	8 2	8 51	8 4	5 38	6 3	6 3	6 4	2 55	8 8	3 22	—			
Th.	21	10 39	9 14	8 6	9 36	8 8	6 25	6 6	6 46	6 8	3 44	9 3	4 3	—			
F.	22	11 26	9 56	8 10	10 15	8 11	7 7	6 9	7 27	6 11	4 22	9 9	4 41	—			
S.	23	morn.	10 34	9 0	10 51	9 1	7 48	7 0	8 6	7 1	5 0	10 3	5 19	—			
W.	24	0 12	11 8	9 1	11 23	9 2	8 22	7 3	8 36	7 4	5 37	10 7	5 53	—			
M.	25	0 55	11 38	9 2	11 52	9 2	8 51	7 4	9 4	7 4	6 8	10 9	6 22	—			
Tu.	26	1 38	—	—	0 7	9 2	9 19	7 3	9 34	7 3	6 37	10 9	6 53	—			
W.	27	2 20	0 24	9 2	0 40	9 2	9 48	7 2	10 1	7 1	7 9	10 6	7 24	—			
Th.	28	3 2	0 56	9 2	1 13	9 1	10 16	6 11	10 32	6 10	7 40	10 2	7 56	—			
F.	29	3 45	1 30	9 1	1 50	9 0	10 50	6 9	11 8	6 7	8 13	9 9	8 31	—			
S.	30	4 29	2 10	8 11	2 31	8 9	11 31	6 4	11 58	6 1	8 51	9 4	9 13	—			
W.	31	5 15	2 54	8 7	3 17	8 5	—	—	0 26	5 10	9 39	8 10	10 7	—			
Half Mean Spring } Range.			4ft. 9in.				3ft. 10in.				5ft. 7in.						
Phases of the Moon.						Moon's Declination at Noon.											
D. H. M.						M.D. ° '			M.D. ° '			M.D. ° '			M.D. ° '		
Last Quarter - 2 7 39 Morning.						1 4 S. 22 9			17 S. 42 17			17 N. 18 25					
New - - - - 9 7 46 Morning.						2 8 35 10			14 4 18			19 31 26					
First Quarter - 15 11 6 Afternoon.						3 12 33 11			9 32 19			20 45 27					
Full - - - 23 10 2 Afternoon.						4 16 3 12			4 29 20			20 59 28					
						5 18 49 13			0 N. 42 21			20 14 29					
In Perigee - - 10 2 0 Morning.						6 20 34 14			5 42 22			18 35 30					
In Apogee - - 24 9 0 Afternoon.						7 21 3 15			10 16 23			16 8 31					
						8 20 5 16			14 11 24			13 2					

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 2 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 s

## JANUARY, 1864.

NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		
7 37	10 11		7 59	10 7		6 34	13 8		6 54	13 5		0 25	10 6		0 46	10 3	21.7	
8 23	10 4		8 52	10 1		7 18	13 2		7 47	12 11		1 9	10 1		1 37	9 10	(	
9 22	10 0		9 57	9 11		8 16	12 9		8 50	12 7		2 7	9 8		2 42	9 6	23.7	
10 33	10 0		11 8	10 1		9 27	12 7		10 2	12 8		3 21	9 6		4 0	9 6	24.7	
11 43	10 4		—	—		10 36	12 11		11 9	13 2		4 36	9 8		5 11	9 10	25.7	
0 16	10 7		0 47	10 11		11 41	13 6		—	—		5 43	10 2		6 12	10 8	26.7	
1 16	11 3		1 43	11 8		0 10	14 0		0 37	14 6		6 38	11 3		7 1	11 11	27.7	
2 8	12 1		2 32	12 7		1 2	15 0		1 27	15 7		7 22	12 6		7 43	13 1	28.7	
2 56	13 0		3 20	13 5		1 53	16 2		2 18	16 7		8 6	13 7		8 30	13 11	●	
3 44	13 9		4 9	14 0		2 43	16 11		3 6	17 2		8 54	14 1		9 17	14 3	1.2	
4 33	14 1		4 57	14 1		3 28	17 3		3 51	17 3		9 41	14 3		10 6	14 2	2.2	
5 21	14 0		5 46	13 10		4 16	17 2		4 41	17 0		10 31	13 11		10 55	13 8	3.2	
6 10	13 7		6 34	13 4		5 5	16 9		5 29	16 5		11 20	13 3		11 45	12 10	4.2	
6 58	13 0		7 21	12 7		5 53	16 0		6 17	15 7		—	—		0 9	12 5	5.2	
7 45	12 2		8 13	11 8		6 42	15 0		7 8	14 6		0 33	11 10		1 0	11 4	D	
8 41	11 1		9 12	10 8		7 36	14 0		8 7	13 6		1 27	10 11		1 57	10 5	7.2	
9 45	10 4		10 22	10 2		8 38	13 1		9 15	12 10		2 29	10 0		3 7	9 9	8.2	
11 0	10 0		11 37	10 0		9 55	12 8		10 32	12 7		3 51	9 6		4 30	9 4	9.2	
—	—		0 15	10 11		11 8	12 8		11 42	12 10		5 9	9 4		5 44	9 5	10.2	
0 49	10 3		1 20	10 5		—	—		0 15	13 0		6 16	9 8		6 44	10 1	11.2	
1 48	10 8		2 10	10 11		0 42	13 4		1 4	13 8		7 4	10 6		7 23	10 11	12.2	
2 31	11 3		2 51	11 7		1 26	14 1		1 47	14 5		7 40	11 4		7 57	11 9	13.2	
3 9	11 10		3 27	12 0		2 6	14 9		2 25	15 0		8 14	12 0		8 31	12 3	○	
4 34	12 3		4 0	12 5		2 43	15 3		2 59	15 5		8 47	12 5		9 1	12 6	15.2	
5 4	12 6		4 32	12 8		3 13	15 6		3 28	15 7		9 17	12 7		9 33	12 7	16.2	
6 48	12 7		5 4	12 7		3 44	15 7		3 59	15 7		9 49	12 7		10 5	12 6	17.2	
7 5	12 6		5 36	12 5		4 15	15 6		4 30	15 5		10 20	12 5		10 36	12 3	18.2	
8 51	12 4		6 8	12 3		4 46	15 3		5 2	15 2		10 52	12 1		11 9	11 10	19.2	
9 6	12 1		6 42	11 11		5 19	15 0		5 37	14 9		11 28	11 7		11 48	11 4	20.2	
7 0	11 8		7 20	11 5		5 56	14 6		6 17	14 2		—	—		0 9	11 0	21.2	
7 42	11 1		8 7	10 8		6 39	13 10		7 2	13 6		0 30	10 8		0 54	10 4	22.2	
If Mean Spring } 6ft. 8in. Range.						8ft. 2in.						6ft. 7in.						

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
3 38		9	7 14		17	10 16		25	12 32	
4 6		10	7 39		18	10 35		26	12 45	
4 34		11	8 3		19	10 54		27	12 58	
5 2		12	8 27		20	11 12		28	13 10	
5 29		13	8 50		21	11 30		29	13 21	
5 56		14	9 12		22	11 46		30	13 31	
6 22		15	9 34		23	12 2		31	13 41	
6 48		16	9 55		24	12 17				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 5 m. | LEITH add 12 m. | THURSO add 14 m.

JANUARY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			H. M. P. I.				H. M. P. I.				H. M. P. I.				H. M. P. I.				H. M. P. I.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 GREENOCK add 19 m.      LIVERPOOL add 13 m.      PEMBROKE add 20 m.

## BRITISH AND IRISH PORTS.

7.

JANUARY, 1864.

W. DAY.	MONTH DAY.	WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's AGE AT NOON.													
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.															
		Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.														
		H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.		H. M. F. I.		D.											
1	10	39	31	5	10	57	30	9	2	7	13	7	2	28	13	4	3	6	9	6	3	26	9	4	21	7	
2	11	19	30	0	11	44	29	5	2	50	13	1	3	18	12	11	3	48	9	2	4	17	9	0	(		
3	—	—	—	0	14	28	11	3	48	12	9	4	23	12	7	4	46	8	11	5	18	8	10	23	7		
4	0	47	28	9	1	22	28	10	5	0	12	8	5	35	12	9	5	51	8	10	6	24	8	11	24	7	
5	1	59	29	2	2	37	29	9	6	10	13	0	6	43	13	3	6	57	9	1	7	30	9	3	25	7	
6	3	15	30	7	3	53	31	8	7	15	13	7	7	44	14	0	8	3	9	6	8	35	9	9	26	7	
7	4	29	32	10	5	3	34	2	8	13	14	6	8	38	14	11	9	7	10	0	9	36	10	3	27	7	
8	5	32	35	4	6	1	36	6	9	2	15	5	9	26	15	10	10	1	10	6	10	25	10	10	28	7	
9	6	30	37	6	6	57	38	3	9	51	16	3	10	16	16	6	10	49	11	1	11	13	11	3	●		
10	7	23	39	1	7	48	39	7	10	39	16	10	11	0	17	0	11	37	11	5	—	—	—	—	1	2	
11	8	11	39	10	8	34	39	11	11	21	17	0	11	46	17	0	0	1	11	6	0	25	11	6	2	2	
12	8	56	39	8	9	18	39	3	—	—	—	—	0	11	16	10	0	50	11	5	1	15	11	4	3	2	
13	9	39	38	6	9	59	37	7	0	36	16	7	1	2	16	3	1	39	11	2	2	3	10	11	4	2	
14	10	18	36	6	10	35	35	3	1	27	15	10	1	51	15	5	2	27	10	8	2	51	10	5	5	2	
15	10	54	34	0	11	15	32	8	2	15	14	11	2	41	14	5	3	15	10	2	3	40	9	11	1		
16	11	38	31	4	—	—	—	—	3	8	13	11	3	38	13	6	4	6	9	8	4	37	9	4	7	2	
17	0	4	30	3	0	37	29	4	4	10	13	1	4	48	12	10	5	8	9	1	5	41	8	11	8	2	
18	1	14	28	9	1	54	28	6	5	28	12	8	6	5	12	8	6	17	8	11	6	53	8	11	9	2	
19	2	35	28	7	3	15	28	10	6	42	12	9	7	16	12	10	7	29	9	0	8	4	9	1	10	2	
20	3	54	29	4	4	30	30	1	7	48	13	1	8	17	13	4	8	38	9	3	9	9	9	4	11	2	
21	5	0	30	11	5	27	31	10	8	40	13	8	9	1	14	0	9	36	9	6	10	0	9	9	12	2	
22	5	52	32	8	6	15	33	4	9	20	14	3	9	39	14	6	10	20	9	11	10	38	10	1	13	2	
23	6	36	33	10	6	56	34	4	9	58	14	8	10	16	14	11	10	56	10	3	11	13	10	4	○		
24	7	14	34	9	7	31	35	3	10	32	15	1	10	46	15	2	11	29	10	6	11	44	10	7	15	2	
25	7	47	35	8	8	2	35	9	11	0	15	4	11	14	15	4	12	0	10	7	—	—	—	—	16	2	
26	8	18	35	11	8	33	35	11	11	29	15	4	11	45	15	4	0	17	10	7	0	32	10	7	17	2	
27	8	47	35	10	9	1	35	8	—	—	—	—	0	1	15	3	0	49	10	6	1	4	10	5	18	2	
28	9	15	35	5	9	30	35	2	0	17	15	2	0	34	15	0	1	20	10	4	1	36	10	3	19	2	
29	9	45	34	7	10	0	34	0	0	52	14	10	1	11	14	7	1	53	10	2	2	11	10	0	20	2	
30	10	15	33	3	10	31	32	5	1	30	14	4	1	50	14	0	2	30	9	10	2	50	9	9	21	2	
31	10	48	31	7	11	8	30	9	2	12	13	9	2	35	13	5	3	11	9	7	3	34	9	5	22	2	
Half Mean Spring Range.		18ft. 7in.				8ft. 0in.				5ft. 6in.																	

## Equation of Time at Noon.

M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
1	3 38	Sub.	9	7 14	Sub.	17	10 16	Sub.	25	12 32	Sub.
2	4 6		10	7 39		18	10 35		26	12 45	
3	4 34		11	8 3		19	10 54		27	12 58	
4	5 2		12	8 27		20	11 12		28	13 10	
5	5 29		13	8 50		21	11 30		29	13 21	
6	5 56		14	9 12		22	11 46		30	13 31	
7	6 22		15	6 34		23	12 2		31	13 41	
8	6 48		16	9 55		24	12 17				

be times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## JANUARY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.							
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.					
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.				
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.		
F.	1	5m 4	2 49	8 6	3 9	8 5	—	—	0 19	5 10	9 32	8 9	9 57	8 7	—	—		
S.	2	5 47	3 32	8 4	3 59	8 3	0 48	5 8	1 23	5 7	10 27	8 6	10 57	8 5	—	—		
S.	3	6 33	4 27	8 2	4 59	8 1	1 58	5 7	2 35	5 7	11 31	8 4	—	—	—	—		
M.	4	7 22	5 32	8 1	6 5	8 1	3 10	5 9	3 42	5 11	0 5	8 4	0 39	8 3	—	—		
Tu.	5	8 15	6 41	8 1	7 16	8 2	4 14	6 1	4 42	6 4	1 15	8 7	1 49	8 7	—	—		
W.	6	9 12	7 49	8 4	8 18	8 6	5 8	6 6	5 32	6 9	2 22	9 1	2 50	9 1	—	—		
Th.	7	10 12	8 46	8 9	9 12	9 0	5 57	6 11	6 22	7 2	3 17	9 10	3 41	10 3	—	—		
F.	8	11 14	9 37	9 3	10 2	9 5	6 47	7 5	7 14	7 7	4 4	10 7	4 28	11 3	—	—		
S.	9	0 16	10 27	9 7	10 52	9 8	7 41	7 10	8 6	8 0	4 54	11 4	5 20	11 3	—	—		
S.	10	1 16	11 16	9 9	11 38	9 9	8 29	8 2	8 50	8 3	5 45	11 10	6 8	11 11	—	—		
M.	11	2 13	11 59	9 10	—	—	9 12	8 3	9 35	8 2	6 30	11 11	6 55	11 11	—	—		
Tu.	12	3 7	0 25	9 10	0 51	9 9	9 57	8 0	10 19	7 10	7 20	11 8	7 43	11 4	—	—		
W.	13	3 59	1 15	9 8	1 40	9 7	10 42	7 8	11 5	7 8	8 5	11 0	8 28	10 3	—	—		
Th.	14	4 50	2 6	9 5	2 32	9 3	11 30	7 1	12 0	6 9	8 52	10 4	9 16	9 15	—	—		
F.	15	5 40	2 57	9 1	3 23	8 10	—	—	0 32	6 5	9 46	9 7	10 15	9 8	—	—		
S.	16	6 30	3 50	8 8	4 19	8 6	1 7	6 2	1 44	6 0	10 47	8 11	11 20	8 8	—	—		
S.	17	7 20	4 49	8 4	5 22	8 2	2 22	5 10	2 59	5 9	11 55	8 6	—	—	—	—		
M.	18	8 10	5 58	8 1	6 35	8 0	3 36	5 10	4 9	5 11	0 32	8 5	1 9	8 4	—	—		
Tu.	19	9 0	7 14	8 0	7 50	8 0	4 42	6 0	5 11	6 1	1 47	8 5	2 22	8 6	—	—		
W.	20	9 50	8 23	8 2	8 51	8 4	5 38	6 3	6 3	6 4	2 55	8 8	3 22	8 13	—	—		
Th.	21	10 39	9 14	8 6	9 36	8 8	6 25	6 6	6 46	6 8	3 44	9 3	4 3	9 8	—	—		
F.	22	11 26	9 56	8 10	10 15	8 11	7 7	6 9	7 27	6 11	4 22	9 9	4 41	10 3	—	—		
S.	23	morn.	10 34	9 0	10 51	9 1	7 48	7 0	8 6	7 1	5 0	10 3	5 19	10 3	—	—		
S.	24	0 12	11 8	9 1	11 23	9 2	8 22	7 3	8 36	7 4	5 37	10 7	5 53	10 3	—	—		
M.	25	0 55	11 38	9 2	11 52	9 2	8 51	7 4	9 4	7 4	6 8	10 9	6 22	10 3	—	—		
Tu.	26	1 38	—	—	0 7	9 2	9 19	7 3	9 34	7 3	6 37	10 9	6 53	10 3	—	—		
W.	27	2 20	0 24	9 2	0 40	9 2	9 48	7 2	10 1	7 1	7 9	10 6	7 24	10 3	—	—		
Th.	28	3 2	0 56	9 2	1 13	9 1	10 16	6 11	10 32	6 10	7 40	10 2	7 56	10 3	—	—		
F.	29	3 45	1 30	9 1	1 50	9 0	10 50	6 9	11 8	6 7	8 13	9 9	8 31	9 6	—	—		
S.	30	4 29	2 10	8 11	2 31	8 9	11 31	6 4	11 58	6 1	8 51	9 4	9 13	9 6	—	—		
S.	31	5 15	2 54	8 7	3 17	8 5	—	—	0 26	5 10	9 39	8 10	10 7	8 7	—	—		
Half Mean Spring Range.			4ft. 9in.				3ft. 10in.				5ft. 7in.							
Phases of the Moon.							Moon's Declination at Noon.											
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
Last Quarter - 2 7 39 Morning.							1	4	S. 22	9	17	S. 42	17	17	N. 18	25	9	N. 2
New - - - - 9 7 46 Morning.							2	8	35	10	14	4	18	19	31	26	5	2
First Quarter - 15 11 6 Afternoon.							3	12	33	11	9	32	19	20	45	27	1	1
Full - - - - 23 10 2 Afternoon.							4	16	3	12	4	29	20	20	59	28	3	S.
							5	18	49	13	0	N. 42	21	20	14	29	7	1
In Perigee - - 10 2 0 Morning.							6	20	34	14	5	42	22	18	35	30	11	1
In Apogee - - 24 9 0 Afternoon.							7	21	3	15	10	16	23	16	8	31	14	4
							8	20	5	16	14	11	24	13	2			

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—  
 BELFAST subtract 2 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 m.

## JANUARY, 1864.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's AGE AT NOON.		
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.					
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			
1 8 51	11 9	9 12	11 5		9 3	9 10			9 22	9 8			9 17	10 10	9 36	10 8	21' 7
2 9 38	11 2	10 6	10 11		9 44	9 5			10 8	9 3			10 1	10 5	10 29	10 2	(
3 10 39	10 10	11 15	10 11		10 38	9 2			11 13	9 2			11 0	10 0	11 32	9 11	23' 7
4 11 51	11 0	—	—		11 48	9 2			—	—			—	—	0 4	9 10	24' 7
5 0 27	11 2	1 1	11 6		0 24	9 3			1 1	9 6			0 38	10 0	1 12	10 3	25' 7
6 1 33	11 11	2 2	12 5		1 39	9 9			2 14	10 0			1 47	10 6	2 24	10 10	26' 7
7 2 31	12 11	2 58	13 5		2 46	10 5			3 16	10 9			2 59	11 2	3 32	11 7	27' 7
8 3 24	13 11	3 49	14 5		3 43	11 2			4 10	11 6			4 2	11 11	4 31	12 3	28' 7
9 4 14	14 11	4 39	15 4		4 37	11 10			5 3	12 1			5 0	12 6	5 26	12 9	●
0 5 3	15 8	5 28	15 11		5 29	12 4			5 55	12 6			5 51	13 0	6 15	13 2	1' 2
1 5 52	16 0	6 16	15 11		6 19	12 7			6 42	12 7			6 39	13 3	7 3	13 3	2' 2
2 6 40	15 9	7 4	15 6		7 6	12 5			7 29	12 3			7 27	13 2	7 50	13 1	3' 2
3 7 28	15 1	7 52	14 8		7 52	12 0			8 14	11 8			8 12	12 11	8 33	12 8	4' 2
4 8 16	14 2	8 39	13 7		8 35	11 4			8 54	11 0			8 53	12 4	9 12	12 0	5' 2
5 9 4	12 11	9 30	12 4		9 17	10 7			9 40	10 3			9 32	11 8	9 54	11 3	6' 2
6 9 58	11 9	10 28	11 4		10 3	9 11			10 28	9 7			10 21	10 10	10 51	10 5	7' 2
7 11 3	11 1	11 43	10 11		11 2	9 4			11 40	9 2			11 23	10 2	11 58	9 11	8' 2
8 —	—	0 21	10 10		—	—			0 19	9 0			—	—	0 33	9 9	9' 2
9 0 59	10 11	1 34	11 1		0 59	9 1			1 38	9 2			1 10	9 10	1 47	9 11	10' 2
0 2 6	11 4	2 34	11 8		2 16	9 4			2 49	9 7			2 25	10 1	3 0	10 4	11' 2
1 2 58	12 0	3 22	12 4		3 15	9 10			3 40	10 1			3 30	10 7	3 56	10 10	12' 2
2 3 42	12 8	4 1	12 11		4 2	10 4			4 24	10 7			4 21	11 1	4 44	11 3	13' 2
3 4 21	13 3	4 39	13 6		4 44	10 9			5 2	10 11			5 6	11 5	5 25	11 7	○
4 4 55	13 9	5 11	13 11		5 20	11 1			5 37	11 2			5 43	11 8	5 58	11 9	15' 2
5 5 27	14 1	5 43	14 2		5 54	11 3			6 10	11 3			6 14	11 11	6 30	12 0	16' 2
6 5 59	14 2	6 15	14 1		6 26	11 4			6 41	11 4			6 46	12 0	7 2	12 0	17' 2
7 6 30	14 0	6 45	13 11		6 56	11 3			7 11	11 2			7 18	12 0	7 32	12 0	18' 2
8 7 1	13 9	7 18	13 7		7 27	11 1			7 43	10 11			7 47	11 11	8 3	11 10	19' 2
9 7 36	13 4	7 55	13 0		8 0	10 9			8 16	10 7			8 19	11 9	8 34	11 7	20' 2
10 8 15	12 8	8 36	12 3		8 33	10 5			8 51	10 2			8 51	11 4	9 8	11 2	21' 2
11 8 59	11 10	9 23	11 5		9 11	9 10			9 33	9 8			9 26	10 11	9 47	10 8	22' 2
Half Mean Spring Range. } 7ft. 5in.					5ft. 10in.					6ft. 2in.							

## Equation of Time at Noon.

M.	S.	Sub.	M.D.	M.	S.	Sub.	M.D.	M.	S.	Sub.	M.D.	M.	S.	Sub.
3	38	Sub.	9	7	14	Sub.	17	10	16	Sub.	25	12	32	Sub.
4	6		10	7	39		18	10	35		26	12	45	
4	34		11	8	3		19	10	54		27	12	58	
5	2		12	8	27		20	11	12		28	13	10	
5	29		13	8	50		21	11	30		29	13	21	
5	56		14	9	12		22	11	46		30	13	31	
6	22		15	9	34		23	12	2		31	13	41	
6	48		16	9	55		24	12	17					

Times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 5 m.



## FEBRUARY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.
M.	1	6m 4	8 48	14 2		9 17	13 10		10 23	12 6		10 51	12 4		4 20	10 8		4 45	10 4	
Tu.	2	6 58	9 54	13 9		10 36	13 9		11 21	12 2		11 58	12 3		5 13	10 2		5 47	10 4	
W.	3	7 54	11 21	13 11		—	—		—	—		0 41	12 1		6 27	10 0		7 10	10 10	
Th.	4	8 53	0 6	14 4		0 45	15 0		1 24	12 8		2 8	12 8		7 53	10 4		8 34	10 5	
F.	5	9 54	1 21	15 10		1 53	16 9		2 48	13 7		3 26	13 7		9 12	11 3		9 45	11 5	
S.	6	10 55	2 20	17 9		2 45	18 9		4 0	14 9		4 31	14 7		10 15	12 2		10 41	12 2	
S.	7	11 54	3 10	19 7		3 34	20 4		5 0	15 9		5 28	15 6		11 6	12 11		11 30	13 1	
M.	8	0a 51	3 57	20 9		4 21	21 1		5 53	16 6		6 19	16 0		11 53	13 6		—	—	
Tu.	9	1 46	4 44	21 4		5 5	21 3		6 43	16 11		7 6	16 4		0 17	13 8		0 42	13 1	
W.	10	2 39	5 27	21 1		5 48	20 9		7 27	16 10		7 48	16 2		1 5	13 8		1 28	13 1	
Th.	11	3 31	6 9	20 3		6 30	19 9		8 9	16 5		8 30	15 8		1 50	13 5		2 10	13 1	
F.	12	4 23	6 51	19 0		7 11	18 1		8 50	15 7		9 7	14 11		2 31	13 0		2 53	12 1	
S.	13	5 14	7 33	17 2		7 56	16 2		9 25	14 7		9 45	14 0		3 13	12 3		3 33	11 1	
S.	14	6 6	8 19	15 3		8 46	14 4		10 6	13 6		10 27	13 0		3 55	11 5		4 17	11 1	
M.	15	6 57	9 17	13 8		9 55	13 2		10 54	12 6		11 21	12 3		4 43	10 6		5 12	10 1	
Tu.	16	7 47	10 38	12 11		11 21	12 10		11 56	11 8		—	—		5 48	9 9		6 29	9 1	
W.	17	8 36	—	—		0 5	13 0		0 35	11 11		1 16	11 7		7 10	9 6		7 52	9 1	
Th.	18	9 23	0 45	13 4		1 21	13 11		1 57	12 4		2 35	12 0		8 33	9 11		9 11	10 1	
F.	19	10 9	1 49	14 6		2 13	15 1		3 10	13 0		3 42	12 8		9 40	10 7		10 7	10 1	
S.	20	10 54	2 32	15 9		2 50	16 4		4 9	13 9		4 32	13 5		10 27	11 2		10 46	11 1	
S.	21	11 37	3 7	17 0		3 24	17 6		4 54	14 5		5 14	13 11		11 3	11 8		11 20	11 1	
M.	22	morn.	3 41	17 11		3 56	18 2		5 33	14 10		5 51	14 5		11 36	12 0		11 52	12 1	
Tu.	23	0 19	4 11	18 5		4 27	18 7		6 8	15 2		6 23	14 9		—	—		0 7	12 4	
W.	24	1 1	4 43	18 9		4 57	18 10		6 39	15 4		6 55	14 11		0 24	12 5		0 40	12 4	
Th.	25	1 44	5 12	18 10		5 28	18 8		7 10	15 3		7 23	14 10		0 56	12 6		1 13	12 6	
F.	26	2 27	5 43	18 6		5 58	18 3		7 37	14 11		7 52	14 7		1 28	12 5		1 44	12 4	
S.	27	3 13	6 14	17 11		6 31	17 7		8 8	14 5		8 25	14 2		1 59	12 3		2 14	12 1	
S.	28	4 1	6 49	17 1		7 8	16 6		8 41	14 0		8 55	13 9		2 32	11 11		2 50	11 4	
M.	29	4 51	7 29	15 11		7 53	15 3		9 13	13 5		9 35	13 3		3 9	11 6		3 29	11 1	
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.					
Phases of the Moon.									Moon's Declination at Noon.											
D. H. M.									M.D. ° ' "						M.D. ° ' "					
Last Quarter -			1 0 17 Morning.						1 17 54.22 9 18 39 17 20 N. 19 25 68. 1											
New - - - -			7 6 10 Afternoon.						2 19 48 10 3 N. 36 18 18 55 26 10 2											
First Quarter			14 1 24 Afternoon.						3 20 50 11 8 30 19 16 43 27 13 4											
Full - - - -			22 5 1 Afternoon.						4 20 34 12 12 46 20 13 50 28 16 4											
									5 18 54 13 16 14 21 10 24 29 19 1											
									6 15 55 14 18 46 22 6 33											
In Perigee - -			7 3 0 Afternoon.						7 11 49 15 20 17 23 2 26											
In Apogee - -			20 9 0 Afternoon.						8 6 55 16 20 48 24 1 S. 49											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 4 m.

## FEBRUARY, 1864.

DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	
1 15 7	4 25 15	2 5 31	13 10	5 56	13 7	7 0 16	11	7 23	16 7	7 23	16 7	C
0 14 9	5 22 14	6 6 23	13 4	6 56	13 1	7 50	16 4	8 21	16 1	24	2	
8 14 5	6 37 14	7 7 34	13 0	8 18	13 1	9 3 15	11	9 45	15 11	25	2	
9 15 0	8 0 15	7 9 2	13 4	9 44	13 8	10 27	16 0	11 9	16 3	26	2	
7 16 3	9 8 17	10 10 22	14 1	10 56	14 7	11 49	16 7	—	—	27	2	
8 17 8	10 6 18	5 11 27	15 1	11 53	15 7	0 25	17 1	0 55	17 7	28	2	
3 19 0	10 59 19	7 —	—	0 18	16 1	1 22	18 2	1 49	18 9	●	0	
5 20 0	11 50 20	3 0 43	16 6	1 7	16 10	2 13	19 3	2 38	19 5	0	7	
—	0 16 20	6 1 30	17 1	1 53	17 3	3 0 20	2	3 23	20 5	1	7	
0 20 6	1 3 20	5 2 16	17 4	2 38	17 4	3 44	20 7	4 7	20 7	2	7	
7 20 2	1 49 19	9 2 59	17 3	3 18	17 0	4 28	20 6	4 49	20 3	3	7	
1 19 5	2 32 18	10 3 39	16 8	4 0	16 4	5 9	20 0	5 30	19 8	4	7	
3 18 2	3 14 17	6 4 21	15 11	4 41	15 5	5 51	19 2	6 11	18 8	5	7	
6 16 9	3 58 16	0 5 3	14 10	5 27	14 4	6 33	18 1	6 58	17 6	D	0	
3 15 3	4 50 14	6 5 52	13 10	6 21	13 5	7 23	17 0	7 51	16 5	7	7	
3 14 0	5 59 13	9 6 55	12 11	7 35	12 9	8 23	15 11	9 3	15 7	8	7	
6 13 8	7 18 13	10 8 20	12 7	9 2	12 8	9 43	15 4	10 26	15 3	9	7	
9 14 2	8 37 14	8 9 43	12 10	10 22	13 2	11 8	15 4	11 47	15 6	10	7	
4 15 2	9 30 15	10 10 57	13 6	11 23	13 10	—	—	0 23	15 10	11	7	
0 16 1	10 10 16	11 11 47	14 2	—	—	0 51	16 2	1 13	16 7	12	7	
9 16 11	10 48 17	4 0 5	14 5	0 23	14 9	1 35	17 0	1 54	17 3	13	7	
6 17 8	11 23 17	11 0 40	15 0	0 57	15 3	2 11	17 8	2 28	18 0	○	16	
0 18 1	11 57 18	3 1 14	15 6	1 29	15 8	2 44	18 3	2 58	18 6	15	7	
—	0 14 18	5 1 44	15 10	2 0	15 11	3 14	18 9	3 29	18 11	16	7	
10 18 6	0 47 18	6 2 15	15 11	2 29	15 11	3 44	19 0	3 58	19 0	17	7	
4 18 5	1 21 18	4 2 44	15 11	2 59	15 10	4 12	19 0	4 28	19 0	18	7	
7 18 2	1 54 17	11 3 13	15 9	3 27	15 6	4 43	18 11	4 59	18 9	19	7	
2 17 8	2 31 17	4 3 43	15 4	4 1	15 1	5 15	18 6	5 32	18 3	20	7	
0 16 11	3 10 16	6 4 19	14 10	4 39	14 6	5 50	18 0	6 9	17 8	21	7	
Spring } 9ft. 4in.				8ft. 0in.				9ft. 7in.				

Spring } 9ft. 4in.

8ft. 0in.

9ft. 7in.

## Equation of Time at Noon.

S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
9		9	14 30		17	14 20		25	13 23	
7		10	14 31		18	14 15		26	13 14	
4		11	14 32		19	14 10		27	13 3	
10		12	14 32		20	14 3		28	12 52	
16		13	14 31		21	13 57		29	12 41	
11		14	14 29		22	13 49				
14		15	14 27		23	13 41				
18		16	14 23		24	13 33				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, for  
 subtract 5 m. SHEERNESS subtract 3 m. LONDON 0 m.



## FEBRUARY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.																						
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.																			
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																					
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																			
M.	1	6 m 4	4 45	10	1	5 9	9	11	11 36	17	1	—	—	8 28	11	7	8 55																				
Tu.	2	6 58	5 34	9	9	6 3	9	8	0 7	16	9	0 41	16	5	9 27	11	1	10 5																			
W.	3	7 54	6 40	9	8	7 26	9	9	1 17	16	3	1 55	16	3	10 46	11	0	11 28																			
Th.	4	8 53	8 10	9	11	8 51	10	1	2 35	16	7	3 13	17	2	—	—	0 6																				
F.	5	9 54	9 29	10	4	10 4	10	8	3 50	17	10	4 25	18	7	0 41	11	11	1 15																			
S.	6	10 55	10 37	11	0	11 4	11	4	4 56	19	5	5 21	20	2	1 46	13	1	2 16																			
S.	7	11 54	11 30	11	8	11 56	11	11	5 46	20	9	6 12	21	5	2 42	14	2	3 7																			
M.	8	12 51	—	—	—	0 20	12	2	6 37	21	11	7 1	22	4	3 30	15	0	3 53																			
Tu.	9	1 46	0 43	12	3	1 6	12	4	7 25	22	8	7 49	22	10	4 16	15	8	4 38																			
W.	10	2 39	1 30	12	5	1 52	12	4	8 10	22	9	8 32	22	8	5 0	15	9	5 22																			
Th.	11	3 31	2 14	12	2	2 35	12	0	8 53	22	4	9 14	21	10	5 43	15	4	6 5																			
F.	12	4 23	2 57	11	10	3 18	11	7	9 36	21	4	9 57	20	7	6 27	14	6	6 49																			
S.	13	5 14	3 39	11	4	3 59	11	0	10 17	19	10	10 39	19	1	7 11	13	6	7 35																			
S.	14	6 6	4 19	10	9	4 41	10	5	11 4	18	4	11 32	17	7	7 59	12	5	8 24																			
M.	15	6 57	5 5	10	2	5 32	9	10	—	—	—	0 5	16	10	8 53	11	5	9 26																			
Tu.	16	7 47	6 3	9	7	6 41	9	6	0 40	16	2	1 18	15	9	10 6	10	7	10 48																			
W.	17	8 36	7 28	9	5	7 8	9	5	1 56	15	7	2 34	15	7	11 27	10	5	—																			
Th.	18	9 23	8 50	9	6	8 29	9	8	3 12	15	10	3 50	16	4	0 5	10	7	0 42																			
F.	19	10 9	10 5	9	11	10 32	10	2	4 27	16	11	4 52	17	5	1 16	11	3	1 42																			
S.	20	10 54	10 58	10	5	11 17	10	7	5 16	17	11	5 34	18	5	2 8	12	0	2 28																			
S.	21	11 37	11 35	10	9	11 53	11	0	5 52	18	10	6 9	19	2	2 47	12	8	3 5																			
M.	22	morn.	—	—	—	0 10	11	2	6 26	19	6	6 44	19	10	3 22	13	3	3 37																			
Tu.	23	0 19	0 27	11	3	0 42	11	4	7 0	20	1	7 15	20	3	3 52	13	9	4 7																			
W.	24	1 1	0 56	11	5	1 12	11	5	7 31	20	6	7 47	20	7	4 23	14	1	4 37																			
Th.	25	1 44	1 28	11	5	1 43	11	5	8 22	20	7	8 17	20	7	4 51	14	3	5 7																			
F.	26	2 27	1 58	11	4	2 14	11	3	8 32	20	6	8 47	20	5	5 22	14	1	5 38																			
S.	27	3 13	2 30	11	2	2 45	11	1	9 22	20	1	9 19	19	9	5 53	13	8	6 10																			
S.	28	4 1	3 1	10	11	3 19	10	10	9 37	19	5	9 55	18	11	6 28	13	2	6 48																			
M.	29	4 51	3 37	10	8	3 55	10	5	10 14	18	6	10 35	18	0	7 9	12	6	7 31																			
Half Mean Spring Range.			5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.																						
Phases of the Moon.																			Moon's Declination at Noon.																		
D. H. M.																			M.D. ° ' "																		
Last Quarter 1 0 17 Morning.																			1 17 8.42 9 18.39 17 20 N. 19 25																		
New - - - 7 6 10 Afternoon.																			2 19 48 10 3 N. 36 18 18 55 26																		
First Quarter 14 1 24 Afternoon.																			3 20 50 11 8 30 19 16 43 27																		
Full - - - 22 5 1 Afternoon.																			4 20 34 12 12 46 20 13 50 28																		
																			5 18 54 13 16 14 21 10 24 29																		
In Perigee - 7 3 0 Afternoon.																			6 15 55 14 18 46 22 6 33																		
In Apogee - 20 9 0 Afternoon.																			7 11 49 15 20 17 23 2 26																		
																			8 6 55 16 20 48 24 1 S. 49																		

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

**HARWICH** subtract 5 m.

**HULL** add 1 m.

**SUNDERLAND** add 5 m.

## FEBRUARY, 1864.

MONTH DAY.	GALWAY.								QUEENSTOWN.								WATERFORD.								C's Age at Noon.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.	H. M.	P. I.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
1	9	49	11	1	10	21	10	10	9	55	9	5	10	22	9	3	10	12	10	5	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10	44	10	1	10

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
13 49		9	14 30		17	14 20		25	13 23	
13 57		10	14 31		18	14 15		26	13 14	
14 4		11	14 32		19	14 10		27	13 3	
14 10		12	14 32		20	14 3		28	12 52	
14 16		13	14 31		21	13 57		29	12 41	
14 21		14	14 29		22	13 49				
14 24		15	14 27		23	13 41				
14 28		16	14 23		24	13 33				

## MARCH, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
			H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.																						
Tu.	1	5m45	8 19	14 7		8 50	14 10	0 12	9 10	25 12	9	10 25	12 9		3 51	10 11		4 16																							
W.	2	6 41	9 25	13 9		10 7	13 7	10 55	12 3		11 30	12 5		4 46	10 4		5 20																								
Th.	3	7 39	10 55	13 9		11 44	14 2				0 13	12 0		6 1	10 0		6 44																								
F.	4	8 37	—	—		0 26	14 10	0 58	12 8		1 46	12 6		7 32	10 3		8 14																								
S.	5	9 35	1 3	15 9		1 35	16 8	2 29	13 7		3 8	13 7		8 54	11 2		9 27																								
∅.	6	10 32	2 1	17 9		2 27	18 8	3 42	14 9		4 13	14 7		9 55	12 2		10 22																								
M.	7	11 28	2 50	19 7		3 13	20 4	4 40	15 9		5 8	15 5		10 46	13 0		11 9																								
Tu.	8	0a22	3 36	20 10		3 58	21 2	5 33	16 6		5 56	16 2		11 32	13 6		11 54																								
W.	9	1 16	4 20	21 4		4 42	21 3	6 21	16 10		6 43	16 6		—	—		0 16																								
Th.	10	2 10	5 3	21 1		5 24	20 9	7 5	16 9		7 24	16 3		0 39	13 9		1 2																								
F.	11	3 3	5 44	20 3		6 4	19 8	7 44	16 3		8 2	15 10		1 24	13 5		1 45																								
S.	12	3 56	6 25	18 11		6 44	18 1	8 22	15 6		8 41	15 0		2 5	12 11		2 26																								
∅.	13	4 49	7 4	17 2		7 27	16 3	8 58	14 6		9 16	14 1		2 45	12 3		3 5																								
M.	14	5 41	7 51	15 3		8 15	14 4	9 35	13 5		9 56	13 2		3 27	11 5		3 49																								
Tu.	15	6 31	8 42	13 7		9 15	12 11	10 18	12 3		10 44	12 3		4 12	10 6		4 39																								
W.	16	7 19	9 54	12 7		10 38	12 6	11 15	11 4		11 53	11 9		5 10	9 9		5 47																								
Th.	17	8 6	11 24	12 8		—	—	—	—		0 34	11 3		6 29	9 4		7 13																								
F.	18	8 51	0 6	12 11		0 43	13 5	1 15	12 1		1 56	11 9		7 53	9 8		8 32																								
S.	19	9 34	1 16	14 0		1 41	14 8	2 33	12 9		3 5	12 5		9 6	10 4		9 32																								
∅.	20	10 17	2 3	15 4		2 22	16 1	3 35	13 6		3 59	13 2		9 55	11 0		10 16																								
M.	21	10 59	2 38	16 8		2 54	17 2	4 22	14 2		4 42	13 11		10 33	11 7		10 50																								
Tu.	22	11 42	3 10	17 10		3 26	18 4	5 2	14 9		5 20	14 6		11 6	12 1		11 22																								
W.	23	morn.	3 41	18 7		3 56	18 9	5 37	15 3		5 53	15 0		11 37	12 5		11 52																								
Th.	24	0 26	4 12	19 0		4 29	19 1	6 9	15 5		6 26	15 2		—	—		0 8																								
F.	25	1 11	4 45	19 0		5 0	18 11	6 43	15 4		6 59	15 2		0 26	12 7		0 43																								
S.	26	1 59	5 17	18 10		5 34	18 7	7 12	15 2		7 28	15 0		1 1	12 6		1 17																								
∅.	27	2 49	5 51	18 3		6 10	17 11	7 45	14 9		8 2	14 8		1 35	12 4		1 52																								
M.	28	3 41	6 29	17 5		6 50	16 10	8 20	14 3		8 37	14 3		2 10	12 1		2 36																								
Tu.	29	4 36	7 12	16 3		7 37	15 8	8 56	13 8		9 18	13 9		2 51	11 8		3 12																								
W.	30	5 32	8 4	15 0		8 36	14 5	9 43	13 0		10 9	13 2		3 36	11 2		4 2																								
Th.	31	6 28	9 11	14 1		9 53	14 0	10 42	12 5		11 17	12 9		4 33	10 6		5 6																								
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
D. H. M.																					M.D. ° ' "																				
Last Quarter - 1 1 11 Afternoon.																					1 20 S. 23 9 6 N. 14 17 17 N. 12 25																				
New - - - - 8 3 59 Morning.																					2 20 34 10 10 53 18 14 31 26																				
First Quarter - 15 6 7 Morning.																					3 19 29 11 14 46 19 11 16 27																				
Full - - - - 23 10 24 Morning.																					4 17 9 12 17 44 20 7 33 28																				
Last Quarter - 30 10 20 Afternoon.																					5 13 38 13 19 39 21 3 32 29																				
																					6 9 12 14 20 29 22 0 S. 40 30																				
In Apogee - - 7 2 0 Morning.																					7 4 10 15 20 18 23 4 54 31																				
In Perigee - - 19 8 0 Morning.																					8 1 N. 6 16 19 10 24 8 58																				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 Brest add 18 m.      Devonport add 17 m.      Portsmouth add 16 m.

## MARCH, 1864.

DOVER.					SHEERNESS.					LONDON.					C's AOL. AT NOON.
MORNING.			AFTERNOON.		MORNING.			AFTERNOON.		MORNING.			AFTERNOON.		
Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	
3 32 16	0		3 57 15	6	4 59 14	2		5 23 13	10	6 30 17	4		6 54 16	11	☾
4 26 15	0		4 57 14	7	5 52 13	6		6 25 13	3	7 20 16	7		7 51 16	323.7	
5 33 14	4		6 14 14	5	7 4 13	0		7 49 13	0	8 28 16	0		9 13 15	1024.7	
6 58 14	10		7 39 15	5	8 36 13	2		9 23 13	6	10 1 15	11		10 46 16	225.7	
8 19 16	2		8 50 16	11	10 3 14	0		10 39 14	6	11 30 16	6	—	—	26.7	
9 18 17	9		9 45 18	5	11 9 15	1		11 35 15	7	0 7 17	0		0 38 17	727.7	
10 11 19	1		10 36 19	8	11 59 16	1	—	—	—	1 5 18	2		1 30 18	928.7	
11 120 1	1		11 26 20	4	0 23 16	6		0 46 16	11	1 54 19	4		2 17 19	9	●
11 49 20	6	—	—	—	1 9 17	2		1 31 17	4	2 39 20	2		3 020 5	1.3	
0 13 20	6		0 36 20	4	1 52 17	5		2 13 17	4	3 22 20	7		3 44 20	7	2.3
0 59 20	1		1 22 19	9	2 34 17	2		2 54 17	0	4 5 20	6		4 25 20	3	3.3
1 44 19	3		2 6 18	9	3 14 16	9		3 34 16	4	4 45 20	0		5 4 19	7	4.3
2 26 18	2		2 47 17	6	3 55 15	11		4 15 15	5	5 25 19	2		5 44 18	7	5.3
3 8 16	9		3 30 16	0	4 35 14	10		4 57 14	4	6 7 18	1		6 28 17	6	6.3
3 53 15	3		4 18 14	7	5 22 13	10		5 48 13	4	6 53 16	11		7 17 16	5	☾
4 46 13	11		5 21 13	7	6 18 12	11		6 54 12	7	7 47 15	11		8 22 15	6	8.3
5 59 13	5		6 39 13	6	7 35 12	5		8 20 12	5	9 3 15	3		9 45 15	1	9.3
7 19 13	10		7 58 14	3	9 4 12	7		9 44 12	10	10 27 15	2		11 9 15	4	10.3
8 31 14	5		8 56 15	4	10 20 13	2		10 52 13	6	11 46 15	7		—	—	11.3
9 18 15	10		9 39 16	4	11 16 13	11		11 37 14	3	0 18 15	11		0 42 16	4	12.3
9 57 16	9		10 15 17	2	11 55 14	7		—	—	1 3 16	9		1 23 17	2	13.3
10 33 17	7		10 50 18	0	0 11 14	11		0 27 15	3	1 41 17	6		1 58 17	10	14.3
11 7 18	2		11 24 18	4	0 43 15	6		0 59 15	8	2 13 18	2		2 28 18	6	○
11 41 18	6		11 59 18	7	1 14 15	10		1 28 16	0	2 43 18	9		2 59 18	11	16.3
—	—		0 17 18	8	1 44 16	1		2 0 16	1	3 13 19	1		3 31 19	2	17.3
0 35 18	7		0 53 18	6	2 16 16	1		2 32 16	0	3 45 19	2		4 1 19	2	18.3
1 12 18	4		1 30 18	2	2 48 15	11		3 4 15	9	4 18 19	1		4 35 18	11	19.3
1 50 17	11		2 10 17	7	3 21 15	7		3 39 15	4	4 53 18	9		5 10 18	6	20.3
2 32 17	2		2 54 16	9	3 59 15	1		4 20 14	9	5 30 18	3		5 49 17	11	21.3
3 17 16	3		3 43 15	9	4 42 14	4		5 7 14	0	6 13 17	7		6 38 17	2	☾
4 13 15	4		4 44 14	11	5 36 13	9		6 11 13	5	7 5 16	9		7 38 16	6	23.3
Mean Spring Range.		9ft. 4in.			8ft. 0in.				9ft. 7in.						

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
12 29	Sub.	9	10 38	Sub.	17	8 24	Sub.	25	5 58	Sub.
12 17		10	10 22		18	8 6		26	5 39	
12 4		11	10 6		19	7 48		27	5 21	
11 50		12	9 50		20	7 30		28	5 2	
11 37		13	9 33		21	7 12		29	4 44	
11 22		14	9 16		22	6 54		30	4 26	
11 8		15	8 59		23	6 35		31	4 7	
10 53		16	8 42		24	6 17				

† of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.

## MARCH, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.							
			H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.
Tu.	1	5m45	4	15	10	3	4	37	10	1	11	1	17	6	11	32	17	1	7	55	11	10	8	24	11	0	0
W.	2	6 41	5	5	9	11	5	36	9	9	—	—	—	—	0	10	16	7	8	57	11	3	9	35	11	0	0
Th.	3	7 39	6	12	9	9	6	56	9	8	0	49	16	3	1	29	16	2	10	19	10	11	11	3	11	0	0
F.	4	8 37	7	44	9	9	8	31	9	10	2	11	16	4	2	53	16	10	11	47	11	4	—	—	—	—	—
S.	5	9 35	9	10	10	3	9	46	10	8	3	31	17	8	4	8	18	6	0	23	11	10	0	58	12	5	5
♄.	6	10 32	10	18	11	0	10	46	11	4	4	38	19	4	5	4	20	2	1	28	13	1	1	56	13	8	8
M.	7	11 28	11	11	11	8	11	36	12	0	5	28	20	11	5	51	21	6	2	23	14	2	2	48	14	8	8
Tu.	8	0a22	11	59	12	2	—	—	—	—	6	14	22	0	6	38	22	5	3	10	15	1	3	32	15	3	3
W.	9	1 16	0	22	12	4	0	43	12	5	7	2	22	8	7	24	22	10	3	54	15	8	4	15	15	10	10
Th.	10	2 10	1	5	12	5	1	27	12	4	7	46	22	10	8	8	22	8	4	36	15	10	4	57	15	8	8
F.	11	3 3	1	49	12	3	2	10	12	1	8	28	22	4	8	49	21	11	5	18	15	5	5	39	15	0	0
S.	12	3 56	2	31	11	10	2	52	11	7	9	9	21	3	9	30	20	7	6	0	14	6	6	22	14	0	0
♄.	13	4 49	3	12	11	4	3	32	11	0	9	50	19	10	10	10	19	1	6	43	13	6	7	5	12	11	11
M.	14	5 41	3	52	10	8	4	13	10	5	10	33	18	4	11	0	17	7	7	29	12	5	7	54	11	10	10
Tu.	15	6 31	4	36	10	1	5	1	9	9	11	29	16	10	—	—	—	8	20	11	4	8	50	10	11	11	11
W.	16	7 19	5	28	9	6	6	1	9	4	0	2	16	2	0	39	15	7	9	25	10	6	10	6	10	7	7
Th.	17	8 6	6	42	9	3	7	28	9	3	1	17	15	3	1	56	15	3	10	48	10	3	11	29	10	4	4
F.	18	8 51	8	12	9	4	8	51	9	6	2	36	15	5	3	13	15	10	—	—	—	0	6	10	7	0	0
S.	19	9 34	9	27	9	9	9	59	10	0	3	48	16	5	4	21	17	0	0	40	10	11	1	11	11	4	4
♄.	20	10 17	10	24	10	3	10	47	10	6	4	44	17	7	5	6	18	2	1	34	11	9	1	56	12	1	1
M.	21	10 59	11	6	10	9	11	23	10	11	5	23	18	8	5	39	19	1	2	17	12	7	2	35	12	11	11
Tu.	22	11 42	11	40	11	1	11	56	11	3	5	55	19	6	6	12	19	10	2	52	13	2	3	8	13	0	0
W.	23	morn.	—	—	—	—	0	12	11	5	6	29	20	2	6	45	20	5	3	23	13	9	3	37	13	11	11
Th.	24	0 26	0	27	11	6	0	41	11	6	7	0	20	7	7	16	20	9	3	51	14	2	4	7	14	4	4
F.	25	1 11	0	57	11	7	1	14	11	7	7	33	20	10	7	50	20	10	4	23	14	5	4	39	14	8	8
S.	26	1 59	1	30	11	6	1	46	11	5	8	5	20	9	8	22	20	8	4	55	14	4	5	11	14	2	2
♄.	27	2 49	2	3	11	4	2	20	11	3	8	39	20	5	8	55	20	1	5	28	13	11	5	46	13	8	8
M.	28	3 41	2	38	11	1	2	57	10	11	9	15	19	9	9	35	19	3	6	6	13	5	6	27	13	3	3
Tu.	29	4 36	3	17	10	9	3	37	10	7	9	56	18	10	10	18	18	4	6	50	12	9	7	14	13	0	0
W.	30	5 32	3	58	10	4	4	22	10	2	10	43	17	10	11	16	17	4	7	39	12	1	8	9	11	0	0
Th.	31	6 28	4	50	10	0	5	22	9	10	11	55	16	11	—	—	—	8	43	11	5	9	21	11	1	1	1
Half Mean Spring Range.			5ft. 9in.				10ft. 5in.								7ft. 2in.												
Phases of the Moon.												Moon's Declination at Noon.															
D. H. M.												M. D. ° ' "															
Last Quarter - 1 1 11 Afternoon.												1 20 S. 23 9 6 N. 14 17 17 N. 12 25 12 S. 43															
New - - - 8 3 59 Morning.												2 20 34 10 10 53 18 14 31 26 15 30															
First Quarter - 15 6 7 Morning.												3 19 29 11 14 46 19 11 16 27 18 24															
Full - - - 23 10 24 Morning.												4 17 9 12 17 44 20 7 33 28 19 57															
Last Quarter - 30 10 20 Afternoon.												5 13 38 13 19 39 21 3 32 29 20 23															
												6 9 12 14 20 29 22 0 S. 40 30 19 47															
In Apogee - 7 2 0 Morning.												7 4 10 15 20 18 23 4 54 31 17 47															
In Perigee - 19 8 0 Morning.												8 1 N. 6 16 19 10 24 8 58															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—

HARWICH subtract 5 m.

HULL add 1 m.

SUNDERLAND add 5 m.

## FEBRUARY, 1864.

MONTH DAY.	GALWAY.								QUEENSTOWN.								WATERFORD.								C's Age at Noon.				
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.								
	Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.						
	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	D.						
1	9 49	11 1	10 21	10 10	9 55	9 5	10 22	9 3	10 12	10 5	10 44	10 1	10 44	10 1	10 44	10 1	10 44	10 1	10 44	10 1	10 44	10 1	10 44	0					
2	10 59	10 9	11 41	10 10	10 58	9 1	11 38	9 1	11 19	9 11	11 57	9 10	12 07	9 10	12 07	9 10	12 07	9 10	12 07	9 10	12 07	9 10	12 07	24.2					
3	—	—	0 24	11 1	—	—	0 22	9 2	—	—	0 36	9 11	—	—	0 36	9 11	—	—	0 36	9 11	—	—	0 36	9 11	25.2				
4	1 4	11 5	1 40	11 11	1 4	9 5	1 46	9 9	1 15	10 2	1 54	10 5	1 15	10 2	1 54	10 5	1 15	10 2	1 54	10 5	1 15	10 2	1 54	10 5	26.2				
5	2 12	12 6	2 43	13 2	2 25	10 1	2 58	10 7	2 35	10 11	3 12	11 4	2 35	10 11	3 12	11 4	2 35	10 11	3 12	11 4	2 35	10 11	3 12	11 4	27.2				
6	3 11	13 9	3 36	14 5	3 29	11 0	3 57	11 6	3 45	11 9	4 15	12 3	3 45	11 9	4 15	12 3	3 45	11 9	4 15	12 3	3 45	11 9	4 15	12 3	28.2				
7	4 1	15 0	4 25	15 6	4 24	11 11	4 49	12 3	4 45	12 8	5 11	12 11	4 45	12 8	5 11	12 11	4 45	12 8	5 11	12 11	4 45	12 8	5 11	12 11	29.2				
8	4 48	16 0	5 11	16 4	5 13	12 7	5 37	12 9	5 36	13 2	5 58	13 5	5 36	13 2	5 58	13 5	5 36	13 2	5 58	13 5	5 36	13 2	5 58	13 5	30.2				
9	5 35	16 6	5 57	16 5	6 1	12 11	6 24	12 11	6 22	13 6	6 45	13 6	6 22	13 6	6 45	13 6	6 22	13 6	6 45	13 6	6 22	13 6	6 45	13 6	31.2				
10	6 19	16 4	6 41	16 0	6 46	12 10	7 7	12 7	7 7	13 6	7 28	13 4	7 7	13 6	7 28	13 4	7 7	13 6	7 28	13 4	7 7	13 6	7 28	13 4	32.2				
11	7 3	15 8	7 25	15 2	7 28	12 4	7 49	12 0	7 49	13 2	8 10	12 11	7 49	13 2	8 10	12 11	7 49	13 2	8 10	12 11	7 49	13 2	8 10	12 11	33.2				
12	7 46	14 8	8 8	14 0	8 10	11 8	8 29	11 3	8 30	12 7	8 47	12 3	8 30	12 7	8 47	12 3	8 30	12 7	8 47	12 3	8 30	12 7	8 47	12 3	34.2				
13	8 31	13 4	8 55	12 7	8 47	10 10	9 8	10 4	9 5	11 10	9 24	11 5	9 5	11 10	9 24	11 5	9 5	11 10	9 24	11 5	9 5	11 10	9 24	11 5	35.2				
14	9 19	11 10	9 47	11 2	9 30	9 11	9 53	9 6	9 44	10 11	10 10	10 6	9 44	10 11	10 10	10 6	9 44	10 11	10 10	10 6	9 44	10 11	10 10	10 6	36.2				
15	10 20	10 8	11 0	10 4	10 21	9 1	10 59	8 10	10 43	10 0	11 20	9 8	10 43	10 0	11 20	9 8	10 43	10 0	11 20	9 8	10 43	10 0	11 20	9 8	37.2				
16	11 43	10 3	—	—	11 40	8 8	—	—	11 58	9 5	—	—	11 58	9 5	—	—	11 58	9 5	—	—	11 58	9 5	—	—	11 58	9 5	38.2		
17	0 23	10 3	1 3	10 4	0 21	8 7	1 3	8 8	0 36	9 4	1 14	9 5	0 36	9 4	1 14	9 5	0 36	9 4	1 14	9 5	0 36	9 4	1 14	9 5	39.2				
18	1 41	10 7	2 15	11 0	1 44	8 11	2 24	9 2	1 53	9 7	2 33	9 11	1 53	9 7	2 33	9 11	1 53	9 7	2 33	9 11	1 53	9 7	2 33	9 11	40.2				
19	2 40	11 5	3 3	11 11	2 53	9 5	3 20	9 9	3 5	10 2	3 34	10 6	3 5	10 2	3 34	10 6	3 5	10 2	3 34	10 6	3 5	10 2	3 34	10 6	41.2				
20	3 23	12 3	3 42	12 8	3 41	10 0	4 1	10 4	3 57	10 10	4 19	11 1	3 57	10 10	4 19	11 1	3 57	10 10	4 19	11 1	3 57	10 10	4 19	11 1	42.2				
21	3 59	13 0	4 15	13 5	4 20	10 7	4 38	10 10	4 39	11 4	5 0	11 7	4 39	11 4	5 0	11 7	4 39	11 4	5 0	11 7	4 39	11 4	5 0	11 7	43.2				
22	4 32	13 9	4 47	14 0	4 55	11 1	5 12	11 3	5 18	11 9	5 35	11 11	5 12	11 3	5 18	11 9	5 12	11 3	5 18	11 9	5 12	11 3	5 18	11 9	44.2				
23	5 14	13 3	5 17	14 6	5 28	11 5	5 44	11 6	5 49	12 0	6 4	12 2	5 44	11 6	5 49	12 0	5 44	11 6	5 49	12 0	5 44	11 6	5 49	12 0	45.2				
24	5 33	14 7	5 48	14 7	6 0	11 7	6 15	11 8	6 20	12 3	6 35	12 3	6 15	11 8	6 20	12 3	6 15	11 8	6 20	12 3	6 15	11 8	6 20	12 3	46.2				
25	6 4	14 7	6 20	14 6	6 31	11 8	6 46	11 7	6 51	12 4	7 7	12 3	6 46	11 7	6 51	12 4	6 46	11 7	6 51	12 4	6 46	11 7	6 51	12 4	47.2				
26	6 35	14 4	6 51	14 1	7 2	11 6	7 17	11 4	7 23	12 3	7 38	12 2	7 17	11 4	7 23	12 3	7 17	11 4	7 23	12 3	7 17	11 4	7 23	12 3	48.2				
27	7 8	13 10	7 26	13 7	7 33	11 2	7 50	10 11	7 53	12 0	8 9	11 11	7 53	12 0	8 9	11 11	7 53	12 0	8 9	11 11	7 53	12 0	8 9	11 11	49.2				
28	7 45	13 3	8 6	12 10	8 7	10 8	8 24	10 5	8 26	11 8	8 43	11 5	8 24	10 5	8 26	11 8	8 24	10 5	8 26	11 8	8 24	10 5	8 26	11 8	50.2				
29	8 27	12 4	8 51	11 10	8 42	10 2	9 4	9 11	9 0	11 2	9 19	10 11	9 4	9 11	9 0	11 2	9 19	10 11	9 4	9 11	9 0	11 2	9 19	10 11	51.2				
30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
alf Mean Spring Range.		7ft. 5in.				5ft. 10in.				6ft. 2in.																			

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
13 49	Sub.	9	14 30	Sub.	17	14 20	Sub.	25	13 23	Sub.
13 57		10	14 31		18	14 15		26	13 14	
14 4		11	14 32		19	14 10		27	13 3	
14 10		12	14 32		20	14 3		28	12 52	
14 16		13	14 31		21	13 57		29	12 41	
14 21		14	14 29		22	13 49				
14 24		15	14 27		23	13 41				
14 28		16	14 23		24	13 33				

as of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.



MARCH, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.
Tu.	1	5m45	4 15	8 10		4 41	8 8		3 26	21 9		3 52	21 1		10 37	16 9		11 4	16 2	
W.	2	6 41	5 11	8 6		5 45	8 4		4 25	20 6		5 3	20 0		11 33	15 8		—	—	
Th.	3	7 39	6 26	8 3		7 10	8 2		5 49	19 11		6 39	20 2		0 9	15 5		0 51	15 6	
F.	4	8 37	7 57	8 4		8 38	8 7		7 26	20 9		8 6	21 7		1 42	15 11		2 28	16 7	
S.	5	9 35	9 16	8 10		9 48	9 1		8 43	22 8		9 12	23 8		3 9	17 6		3 44	18 7	
S.	6	10 32	10 16	9 5		10 42	9 8		9 37	24 9		10 1	25 9		4 14	19 7		4 44	20 7	
M.	7	11 28	11 8	9 10		11 33	10 0		10 24	26 7		10 47	27 3		5 11	21 5		5 37	22 1	
Tu.	8	0a22	11 58	10 2		—	—		11 10	27 10		11 33	28 3		6 2	22 8		6 25	23 6	
W.	9	1 16	0 22	10 4		0 44	10 5		11 55	28 6		—	—		6 46	23 3		7 8	23 8	
Th.	10	2 10	1 6	10 5		1 28	10 5		0 17	28 6		0 39	28 4		7 30	23 0		7 51	22 8	
F.	11	3 3	1 50	10 4		2 11	10 2		1 12	27 11		1 21	27 4		8 11	22 2		8 32	21 6	
S.	12	3 56	2 30	10 0		2 50	9 10		1 41	26 6		2 1	25 8		8 53	20 10		9 12	20 6	
S.	13	4 49	3 10	9 7		3 29	9 4		2 20	24 9		2 40	23 9		9 31	19 1		9 51	18 7	
M.	14	5 41	3 50	9 1		4 13	8 10		3 22	22 10		3 25	21 10		10 12	17 5		10 33	16 8	
Tu.	15	6 31	4 37	8 7		5 3	8 4		3 49	20 9		4 18	19 11		10 55	15 8		11 22	14 10	
W.	16	7 19	5 35	8 1		6 13	7 11		4 53	19 2		5 35	18 9		11 57	14 5		—	—	
Th.	17	8 6	6 55	7 10		7 38	7 10		6 22	18 9		7 8	18 11		0 36	14 3		1 21	14 4	
F.	18	8 51	8 18	7 11		8 55	8 1		7 47	19 4		8 24	20 0		2 6	14 8		2 47	15 7	
S.	19	9 34	9 28	8 4		9 54	8 6		8 55	20 8		9 18	21 5		3 22	15 10		3 49	16 7	
S.	20	10 17	10 16	8 8		10 37	8 10		9 39	22 2		9 57	22 10		4 14	17 3		4 36	17 11	
M.	21	10 59	10 55	9 0		11 12	9 1		10 13	23 6		10 28	24 0		4 56	18 6		5 15	19 1	
Tu.	22	11 42	11 30	9 3		11 47	9 4		10 44	24 6		11 0	24 11		5 34	19 7		5 52	20 7	
W.	23	morn.	—	—		0 4	9 6		11 16	25 3		11 31	25 7		6 8	20 4		6 23	20 7	
Th.	24	0 26	0 19	9 7		0 36	9 8		11 47	25 10		—	—		6 39	20 10		6 55	21 0	
F.	25	1 11	0 53	9 9		1 10	9 9		0 4	25 11		0 21	25 11		7 11	21 0		7 27	20 11	
S.	26	1 59	1 27	9 9		1 43	9 8		0 38	25 11		0 54	25 9		7 44	20 9		8 1	20 6	
S.	27	2 49	2 0	9 8		2 17	9 7		1 11	25 5		1 28	25 0		8 18	20 2		8 37	19 9	
M.	28	3 41	2 36	9 6		2 55	9 4		1 46	24 6		2 5	24 0		8 57	19 4		9 17	18 10	
Tu.	29	4 36	3 15	9 2		3 35	9 1		2 25	23 5		2 46	22 10		9 37	18 3		9 59	17 9	
W.	30	5 32	3 59	8 11		4 26	8 9		3 10	22 2		3 37	21 6		10 23	17 2		10 50	16 6	
Th.	31	6 28	4 57	8 8		5 31	8 6		4 11	20 11		4 49	20 5		11 20	16 0		11 56	15 11	
Half Mean Spring Range.			4 ft. 10 in.			13 ft. 0 in.			10 ft. 6 in.											
Phases of the Moon.						Moon's Declination at Noon.														
D. H. M.						M.D. ° ' "						M.D. ° ' "								
Last Quarter - 1 1 11 Afternoon.						1 20 S. 23 9 6 N. 14 17 17 N. 12 25 12 S. 4														
New - - - - 8 3 59 Morning.						2 20 34 10 10 53 18 14 31 26 15 5														
First Quarter 15 6 7 Morning.						3 19 29 11 14 46 19 11 16 27 18 2														
Full - - - - 23 10 24 Morning.						4 17 9 12 17 44 20 7 33 28 19 5														
Last Quarter - 30 10 20 Afternoon.						5 13 38 13 19 39 21 3 32 29 20 2														
In Apogee - - 7 2 0 Morning.						6 9 12 14 20 29 22 0 S. 40 30 19 4														
In Perigee - - 19 8 0 Morning.						7 4 10 15 20 18 23 4 54 31 17 4														
						8 1 N. 6 16 19 10 24 8 58														

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

## MARCH, 1864.

SUN IN 1864.	DOVER.								SHEERNESS.								LONDON.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	D.						
1	3 32 16 0		3 57 15 6		4 59 14 2		5 23 13 10		6 30 17 4		6 54 16 11														
2	4 26 15 0		4 57 14 7		5 52 13 6		6 25 13 3		7 20 16 7		7 51 16 32		23.7												
3	5 33 14 4		6 14 14 5		7 4 13 0		7 49 13 0		8 28 16 0		9 13 15 10		24.7												
4	6 58 14 10		7 39 15 5		8 36 13 2		9 23 13 6		10 1 15 11		10 46 16 22		25.7												
5	8 19 16 2		8 50 16 11		10 3 14 0		10 39 14 6		11 30 16 6		—		26.7												
6	9 18 17 9		9 45 18 5		11 9 15 1		11 35 15 7		0 7 17 0		0 38 17 72		727.7												
7	10 11 19 1		10 36 19 8		11 59 16 1		—		1 5 18 2		1 30 18 92		928.7												
8	11 120 1		11 26 20 4		0 23 16 6		0 46 16 11		1 54 19 4		2 17 19 9		●												
9	11 49 20 6		—		1 9 17 2		1 31 17 4		2 39 20 2		3 020 5 1.3														
0	0 13 20 6		0 36 20 4		1 52 17 5		2 13 17 4		3 22 20 7		3 44 20 7		2.3												
1	0 59 20 1		1 22 19 9		2 34 17 2		2 54 17 0		4 5 20 6		4 25 20 3		3.3												
2	1 44 19 3		2 6 18 9		3 14 16 9		3 34 16 4		4 45 20 0		5 4 19 7		4.3												
3	2 26 18 2		2 47 17 6		3 55 15 11		4 15 15 5		5 25 19 2		5 44 18 7		5.3												
4	3 8 16 9		3 30 16 0		4 35 14 10		4 57 14 4		6 7 18 1		6 28 17 6		6.3												
5	3 53 15 3		4 18 14 7		5 22 13 10		5 48 13 4		6 53 16 11		7 17 16 5		—												
6	4 46 13 11		5 21 13 7		6 18 12 11		6 54 12 7		7 47 15 11		8 22 15 6		8.3												
7	5 59 13 5		6 39 13 6		7 35 12 5		8 20 12 5		9 3 15 3		9 45 15 1		9.3												
8	7 19 13 10		7 58 14 3		9 4 12 7		9 44 12 10		10 27 15 2		11 9 15 4		10.3												
9	8 31 14 9		8 56 15 4		10 20 13 2		10 52 13 6		11 46 15 7		—		11.3												
0	9 18 15 10		9 39 16 4		11 16 13 11		11 37 14 3		0 18 15 11		0 42 16 4		12.3												
1	9 57 16 9		10 15 17 2		11 55 14 7		—		1 3 16 9		1 23 17 2		13.3												
2	10 33 17 7		10 50 18 0		0 11 14 11		0 27 15 3		1 41 17 6		1 58 17 10		14.3												
3	11 7 18 2		11 24 18 4		0 43 15 6		0 59 15 8		2 13 18 2		2 28 18 6		—												
4	11 41 18 6		11 59 18 7		1 14 15 10		1 28 16 0		2 43 18 9		2 59 18 11		16.3												
5	—		0 17 18 8		1 44 16 1		2 0 16 1		3 13 19 1		3 31 19 2		17.3												
6	0 35 18 7		0 53 18 6		2 16 16 1		2 32 16 0		3 45 19 2		4 1 19 2		18.3												
7	1 12 18 4		1 30 18 2		2 48 15 11		3 4 15 9		4 18 19 1		4 35 18 11		19.3												
8	1 50 17 11		2 10 17 7		3 21 15 7		3 39 15 4		4 53 18 9		5 10 18 6		20.3												
9	2 32 17 2		2 54 16 9		3 59 15 1		4 20 14 9		5 30 18 3		5 49 17 11		21.3												
0	3 17 16 3		3 43 15 9		4 42 14 4		5 7 14 0		6 13 17 7		6 38 17 2		—												
1	4 13 15 4		4 44 14 11		5 36 13 9		6 11 13 5		7 5 16 9		7 38 16 6		23.3												
Mean Spring Range.				9ft. 4in.				8ft. 0in.				9ft. 7in.													

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
12 29		9	10 38		17	8 24		25	5 58	
12 17		10	10 22		18	8 6		26	5 39	
12 4		11	10 6		19	7 48		27	5 21	
11 50		12	9 50		20	7 30		28	5 2	
11 37		13	9 33		21	7 12		29	4 44	
11 23		14	9 16		22	6 54		30	4 26	
11 8		15	8 59		23	6 35		31	4 7	
10 53		16	8 42		24	6 17				

Use of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—See  
 DOVER subtract 6 m. . / SHEERNESS subtract 3 m. . / LONDON 0 m.



MARCH, 1864.

HARVILL.												HULL.												SUNDERLAND.											
MORNING.						AFTERNOON.						MORNING.						AFTERNOON.						MORNING.						AFTERNOON.					
Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.					
H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.				
Tu.	1	4	15	12	3	4	37	10	1	11	15	6	11	32	17	1	7	53	11	10	8	24	11	6	8	41	11	10	8	24	11				
W.	2	4	41	12	3	4	36	9	9	—	—	0	10	15	7	8	57	11	5	9	35	11	6	9	52	11	10	9	35	11					
Th.	3	5	29	12	3	5	36	9	8	0	49	15	3	1	29	16	2	10	19	10	11	11	3	11	—	—	—	—	—	—					
F.	4	6	37	12	3	5	31	9	10	2	11	15	4	2	53	15	10	11	47	11	4	—	—	—	—	—	—	—	—	—					
S.	5	7	35	12	3	5	45	10	8	3	31	17	5	4	8	18	6	0	23	11	10	0	58	12	5	1	16	11	0	58	12				
▲	6	8	32	12	13	6	12	4	4	38	19	4	5	4	20	2	1	28	13	1	1	56	13	8	2	13	12	1	1	56	13				
M.	7	11	28	11	11	11	3	6	5	28	20	11	5	5	21	6	2	23	14	2	2	48	14	10	3	21	11	2	2	48	14				
Tu.	8	—	—	12	2	—	—	—	—	6	14	22	0	6	38	22	5	3	10	15	1	3	32	15	10	4	15	11	3	32	15				
W.	9	1	16	9	22	12	4	0	4	3	12	5	7	2	22	8	7	24	22	10	3	54	15	8	4	15	15	4	4	15	15				
Th.	10	2	16	1	5	12	5	1	7	46	22	10	8	8	22	8	4	36	15	10	4	57	15	10	4	57	15	10	4	57	15				
F.	11	3	3	1	4	9	12	3	2	10	12	1	8	28	22	4	8	49	21	11	5	39	15	5	5	39	15	5	5	39	15				
S.	12	3	56	2	3	11	10	2	2	52	11	7	9	9	21	3	9	30	20	7	6	22	14	6	6	22	14	6	6	22	14				
▲	13	4	49	3	12	11	4	3	3	32	11	0	9	50	19	10	10	10	19	1	6	43	13	6	7	5	12	13	7	5	12	13			
M.	14	5	41	3	52	10	8	4	4	13	10	5	10	33	18	4	11	0	17	7	7	29	12	5	7	54	11	8	7	54	11				
Tu.	15	6	11	4	36	10	1	5	1	5	9	9	11	29	16	10	—	—	—	8	20	11	4	8	50	10	10	8	50	10					
W.	16	7	19	5	28	9	6	6	1	9	4	0	0	2	16	2	0	39	15	7	9	25	10	6	10	6	10	6	10	6	10				
Th.	17	8	6	6	42	9	3	7	28	9	3	1	17	15	3	1	56	15	3	10	48	10	3	11	29	10	4	11	29	10					
F.	18	8	51	8	12	9	4	8	51	9	6	2	36	15	5	3	13	15	10	—	—	—	—	—	—	—	—	—	—	—	—				
S.	19	9	14	9	27	9	9	9	59	10	0	3	48	16	5	4	21	17	0	0	40	10	11	1	11	11	4	1	11	11					
▲	20	10	17	10	24	10	3	10	47	10	6	4	44	17	7	5	6	18	2	1	34	11	9	1	56	12	4	1	56	12					
M.	21	10	50	11	6	10	9	11	23	10	11	5	23	18	8	5	39	19	1	2	17	12	7	2	35	12	10	2	35	12					
Tu.	22	11	42	11	40	11	1	11	56	11	3	5	55	19	6	6	12	19	10	2	52	13	2	3	8	13	10	3	8	13					
W.	23	morn.	—	—	—	—	0	12	11	5	6	29	20	2	6	45	20	5	3	23	13	9	3	37	13	10	4	3	37	13					
Th.	24	0	26	0	27	11	6	0	41	11	6	7	0	20	7	7	16	20	9	3	51	14	2	4	7	14	4	4	7	14					
F.	25	1	11	0	55	11	7	1	14	11	7	7	33	20	10	7	50	20	10	4	23	14	5	4	39	14	5	4	39	14					
S.	26	1	50	1	30	11	6	1	46	11	5	8	5	20	9	8	22	20	8	4	55	14	4	5	11	14	5	5	11	14					
▲	27	2	40	2	3	11	4	2	20	11	3	8	39	20	5	8	55	20	1	5	28	13	11	5	46	13	10	5	46	13					
M.	28	3	41	2	38	11	1	2	57	10	11	9	15	19	9	9	35	19	3	6	6	13	5	6	27	13	10	6	27	13					
Tu.	29	4	39	3	17	10	9	3	37	10	7	9	56	18	10	10	18	18	4	6	50	12	9	7	14	12	10	7	14	12					
W.	30	5	37	3	58	10	4	4	22	10	2	10	43	17	10	11	16	17	4	7	39	12	1	8	9	11	10	8	9	11					
Th.	31	6	38	4	50	10	0	5	22	9	10	11	55	10	11	—	—	—	—	8	43	11	5	9	21	11	10	9	21	11					
High Water Spring } 5ft. 9in. Low Water Spring }												10ft. 5in.												7ft. 2in.											
Phases of the Moon.												Moon's Declination at Noon.																							
W. H. M.												M.D. °						M.D. °						M.D. °						M.D. °					
Last Quarter - 1 1 11 Afternoon.												1 20 23 0 23 14						17 17 13 25 12 5 4						17 17 13 25 12 5 4						17 17 13 25 12 5 4					
New - 8 8 10 Morning.												2 20 24 10 25 15						18 14 31 25 15 5						18 14 31 25 15 5						18 14 31 25 15 5					
First Quarter - 15 5 5 Morning.												3 20 25 11 26 16						19 11 25 27 18 2						19 11 25 27 18 2						19 11 25 27 18 2					
Full - 22 10 10 Morning.												4 20 26 12 27 17						20 7 25 28 19 5						20 7 25 28 19 5						20 7 25 28 19 5					
Last Quarter - 29 10 10 Afternoon.												5 20 26 13 28 18						21 5 25 29 20 2						21 5 25 29 20 2						21 5 25 29 20 2					
In Apogee - 2 2 2 Morning.												6 20 26 14 29 19						22 4 25 30 19 4						22 4 25 30 19 4						22 4 25 30 19 4					
In Perigee - 12 8 8 Morning.												7 20 26 15 30 20						23 4 25 31 17 4						23 4 25 31 17 4						23 4 25 31 17 4					

The times of High Water are given for Mean Time at Dover. If Greenwich or Railway Time be required, —  
 Subtract 1 hour 1 min. 1 sec.      Subtract 1 min. 1 sec.      Subtract 1 min. 1 sec.

## MARCH, 1864.

MONTH DAY.	NORTH SHIELDS.								LEITH.								THURSO.								C's Age AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.							
1	7 59	10 9	8 30	10 4	6 54	13 6	7 24	13 1	0 46	10 4	1 16	10 0	0												
2	9 6	10 0	9 47	9 10	8 0	12 9	8 40	12 6	1 51	9 9	2 31	9 6	23.7												
3	10 31	9 10	11 15	10 0	9 25	12 5	10 10	12 8	3 18	9 5	4 8	9 6	24.7												
4	12 0	10 4	—	—	10 53	12 11	11 30	13 5	4 54	9 8	5 32	10 1	25.7												
5	0 37	10 10	1 11	11 4	—	—	0 5	14 0	6 7	10 8	6 35	11 5	26.7												
6	1 39	11 10	2 3	12 5	0 33	14 8	0 58	15 4	6 57	12 2	7 18	12 11	27.7												
7	2 27	13 0	2 49	13 6	1 22	16 0	1 46	16 8	7 37	13 7	7 57	14 2	28.7												
8	3 10	14 0	3 32	14 4	2 8	17 2	2 31	17 7	8 19	14 7	8 40	14 9													
9	3 54	14 6	4 15	14 8	2 52	17 9	3 12	17 10	9 0	14 10	9 21	14 9	1.3												
10	4 37	14 7	4 59	14 5	3 33	17 9	3 55	17 7	9 43	14 7	10 6	14 3	2.3												
11	5 21	14 1	5 43	13 9	4 16	17 3	4 38	16 10	10 28	13 10	10 49	13 4	3.3												
12	6 4	13 4	6 26	12 11	4 59	16 5	5 20	15 11	11 11	12 9	11 33	12 2	4.3												
13	6 46	12 5	7 7	11 11	5 41	15 5	6 3	14 9	11 55	11 7	—	—	5.3												
14	7 31	11 4	7 58	10 9	6 28	14 2	6 53	13 6	0 19	11 0	0 45	10 5	6.3												
15	8 26	10 2	8 58	9 8	7 21	12 11	7 53	12 5	1 12	9 10	1 43	9 4	7												
16	9 36	9 4	10 18	9 2	8 29	12 0	9 11	11 9	2 20	8 11	3 4	8 8	8.3												
17	11 0	9 2	11 42	9 4	9 55	11 9	10 35	11 10	3 51	8 8	4 35	8 8	9.3												
18	—	—	0 20	9 7	11 13	12 1	11 47	12 5	5 14	8 10	5 49	9 1	10.3												
19	0 54	9 11	1 23	10 3	—	—	0 17	12 9	6 19	9 6	6 41	10 0	11.3												
20	1 45	10 7	2 5	10 11	0 39	13 3	0 59	13 9	6 59	10 6	7 15	11 1	12.3												
21	2 23	11 4	2 38	11 9	1 17	14 3	1 34	14 8	7 29	11 6	7 43	12 0	13.3												
22	2 54	12 1	3 9	12 5	1 50	15 1	2 6	15 5	7 56	12 5	8 10	12 9	14.3												
23	3 23	12 8	3 37	12 10	2 21	15 9	2 36	16 0	8 24	13 0	8 38	13 2	15												
24	3 52	13 0	4 8	13 2	2 50	16 2	3 5	16 3	8 53	13 3	9 9	13 3	16.3												
25	4 24	13 3	4 41	13 2	3 20	16 3	3 36	16 2	9 25	13 2	9 42	13 1	17.3												
26	4 58	13 0	5 15	12 11	3 52	16 1	4 9	15 11	9 59	12 11	10 17	12 8	18.3												
27	5 32	12 8	5 50	12 6	4 27	15 9	4 45	15 6	10 35	12 5	10 55	12 1	19.3												
28	6 10	12 3	6 30	12 0	5 4	15 3	5 25	14 11	11 17	11 9	11 40	11 5	20.3												
29	6 52	11 8	7 15	11 4	5 48	14 7	6 12	14 2	—	—	0 3	11 0	21.3												
30	7 42	11 0	8 14	10 7	6 38	13 9	7 8	13 4	0 30	10 7	1 0	10 3	22												
31	8 51	10 3	9 31	10 0	7 45	13 0	8 25	12 9	1 36	9 11	2 16	9 9	23.3												
If Mean Spring } Range.				6ft. 8in.	8ft. 2in.				6ft. 7in.																

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
12 29	Sub.	9	10 38	Sub.	17	8 24	Sub.	25	5 58	Sub.
12 17		10	10 22		18	8 6		26	5 39	
12 4		11	10 6		19	7 48		27	5 21	
11 50		12	9 50		20	7 30		28	5 2	
11 37		13	9 33		21	7 12		29	4 44	
11 22		14	9 16		22	6 54		30	4 26	
11 8		15	8 59		23	6 35		31	4 7	
10 53		16	8 42		24	6 17				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.

Table 1											
The East				The West				The North			
Time	Height	Time	Height	Time	Height	Time	Height	Time	Height	Time	Height
1	10	2	10	3	10	4	10	5	10	6	10
7	10	8	10	9	10	10	10	11	10	12	10
13	10	14	10	15	10	16	10	17	10	18	10
19	10	20	10	21	10	22	10	23	10	24	10
25	10	26	10	27	10	28	10	29	10	30	10
31	10	32	10	33	10	34	10	35	10	36	10
37	10	38	10	39	10	40	10	41	10	42	10
43	10	44	10	45	10	46	10	47	10	48	10
49	10	50	10	51	10	52	10	53	10	54	10
55	10	56	10	57	10	58	10	59	10	60	10
61	10	62	10	63	10	64	10	65	10	66	10
67	10	68	10	69	10	70	10	71	10	72	10
73	10	74	10	75	10	76	10	77	10	78	10
79	10	80	10	81	10	82	10	83	10	84	10
85	10	86	10	87	10	88	10	89	10	90	10
91	10	92	10	93	10	94	10	95	10	96	10
97	10	98	10	99	10	100	10	101	10	102	10
103	10	104	10	105	10	106	10	107	10	108	10
109	10	110	10	111	10	112	10	113	10	114	10
115	10	116	10	117	10	118	10	119	10	120	10
121	10	122	10	123	10	124	10	125	10	126	10
127	10	128	10	129	10	130	10	131	10	132	10
133	10	134	10	135	10	136	10	137	10	138	10
139	10	140	10	141	10	142	10	143	10	144	10
145	10	146	10	147	10	148	10	149	10	150	10
151	10	152	10	153	10	154	10	155	10	156	10
157	10	158	10	159	10	160	10	161	10	162	10
163	10	164	10	165	10	166	10	167	10	168	10
169	10	170	10	171	10	172	10	173	10	174	10
175	10	176	10	177	10	178	10	179	10	180	10
181	10	182	10	183	10	184	10	185	10	186	10
187	10	188	10	189	10	190	10	191	10	192	10
193	10	194	10	195	10	196	10	197	10	198	10
199	10	200	10	201	10	202	10	203	10	204	10
205	10	206	10	207	10	208	10	209	10	210	10
211	10	212	10	213	10	214	10	215	10	216	10
217	10	218	10	219	10	220	10	221	10	222	10

~~Handwritten text, mostly illegible due to blurring and crossing out.~~

## MARCH, 1864.

ESTON-SUPER-MARE.						HOLYHEAD.						KINGSTOWN.						C's AGE AT NOON.								
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.											
me.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.										
M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	D.							
43	0	8	11	31	29	8	2	27	13	5	2	57	13	1	3	26	9	5	3	55	9	2	0			
—	—	—	0	5	28	11	3	32	12	9	4	12	12	6	4	30	9	0	5	9	8	10	23.7			
45	28	5	1	30	28	8	4	58	12	6	5	43	12	9	5	49	8	9	6	32	8	11	24.7			
18	29	3	3	0	30	4	6	27	13	0	7	4	13	6	7	14	9	2	7	51	9	5	25.7			
43	31	8	4	21	33	3	7	39	14	1	8	8	14	8	8	28	9	9	9	0	10	12	26.7			
54	34	11	5	25	36	5	8	33	15	4	8	56	15	11	9	29	10	5	9	56	10	9	27.7			
52	37	10	6	18	38	11	9	19	16	5	9	42	16	10	10	18	11	1	10	39	11	5	28.7			
44	39	9	7	8	40	5	10	4	17	2	10	25	17	5	11	0	11	7	11	22	11	9	29.7			
30	40	10	7	52	40	11	10	44	17	6	11	4	17	6	11	43	11	10	—	—	—	—	1.3			
13	40	7	8	34	40	1	11	25	17	4	11	46	17	1	0	5	11	9	0	28	11	8	2.3			
53	39	5	9	12	38	5	—	—	—	—	0	8	16	9	0	50	11	6	1	12	11	3	3.3			
31	37	4	9	48	36	1	0	30	16	3	0	53	15	9	1	33	11	0	1	55	10	8	4.3			
53	34	8	10	22	33	3	1	15	15	3	1	37	14	8	2	16	10	4	2	37	10	0	5.3			
40	31	8	11	0	30	2	2	1	14	1	2	26	13	6	3	0	9	9	3	25	9	5	6.3			
24	28	10	11	55	27	8	2	53	12	11	3	24	12	5	3	51	9	1	4	23	8	9	7.3			
—	—	—	0	33	26	10	4	1	12	0	4	44	11	9	4	59	8	6	5	37	8	5	8.3			
14	26	8	1	59	26	9	5	28	11	10	6	9	11	11	6	17	8	5	6	56	8	6	9.3			
40	27	3	3	19	28	0	6	47	12	2	7	21	12	6	7	34	8	8	8	8	8	11	10.3			
56	28	11	4	26	29	11	7	51	12	10	8	14	13	3	8	41	9	1	9	6	9	4	11.3			
53	31	0	5	16	32	2	8	35	13	8	8	53	14	2	9	29	9	7	9	50	9	10	12.3			
37	33	2	5	56	34	1	9	8	14	6	9	23	14	10	10	7	10	0	10	23	10	3	13.3			
15	34	10	6	33	35	7	9	39	15	2	9	54	15	5	10	37	10	5	10	52	10	7	14.3			
50	36	0	7	5	36	6	10	9	15	7	10	23	15	9	11	6	10	9	11	20	10	10	15.3			
22	36	11	7	39	37	2	10	38	15	11	10	52	16	0	11	36	10	11	11	52	10	11	16.3			
55	37	2	8	11	37	1	11	7	15	11	11	22	15	10	—	—	—	—	0	9	10	11	17.3			
27	36	11	8	43	36	8	11	39	15	9	11	58	15	7	0	26	10	10	0	43	10	9	18.3			
59	36	3	9	17	35	8	—	—	—	—	0	16	15	4	1	1	10	8	1	19	10	6	19.3			
34	35	0	9	52	34	2	0	37	15	1	0	59	14	9	1	39	10	3	1	59	10	1	20.3			
9	33	3	10	27	32	4	1	22	14	5	1	45	14	0	2	22	9	11	2	45	9	9	21.3			
50	31	3	11	18	30	3	2	11	13	8	2	41	13	4	3	10	9	6	3	39	9	4	22.3			
51	29	6	—	—	—	—	3	17	13	0	3	57	12	9	4	16	9	1	4	55	8	11	23.3			
in Spring } 60.			18ft. 7in.			8ft. 0in.			5ft. 6in.																	

## Equation of Time at Noon.

S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
29		9	10 38		17	8 24		25	5 58	
17		10	10 22		18	8 6		26	5 39	
4		11	10 6		19	7 48		27	5 21	
50		12	9 50		20	7 30		28	5 2	
37		13	9 33		21	7 12		29	4 44	
22		14	9 16		22	6 54		30	4 26	
8		15	8 59		23	6 35		31	4 7	
53		16	8 42		24	6 17				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## MARCH, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.							
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.					
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.				
			H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.			
Tu.	1	5m45	3 10	8 6	3 39	8 4	0 18	5 11	0 55	5 8	10 3	8 7	10 41	8 5				
W.	2	6 41	4 12	8 2	4 50	8 1	1 37	5 7	2 24	5 6	11 21	8 3	—	—				
Th.	3	7 39	5 31	8 0	6 13	8 1	3 8	5 8	3 51	5 11	0 4	8 3	0 47	8 5				
F.	4	8 37	6 59	8 2	7 38	8 3	4 30	6 2	5 1	6 6	1 32	8 7	2 10	8 11				
S.	5	9 35	8 13	8 6	8 42	8 9	5 29	6 9	5 54	7 1	2 46	9 5	3 13	9 11				
S.	6	10 32	9 7	9 1	9 31	9 5	6 18	7 5	6 42	7 8	3 36	10 5	3 58	10 11				
M.	7	11 28	9 55	9 8	10 17	9 10	7 7	7 11	7 31	8 2	4 21	11 5	4 44	11 9				
Tu.	8	on 22	10 39	9 11	11 1	10 0	7 54	8 4	8 15	8 6	5 7	12 1	5 31	12 5				
W.	9	1 16	11 22	10 0	11 42	10 0	8 35	8 7	8 54	8 6	5 52	12 4	6 12	12 4				
Th.	10	2 10	—	—	0 3	9 11	9 15	8 5	9 35	8 3	6 33	12 2	6 55	11 11				
F.	11	3 3	0 25	9 10	0 47	9 9	9 54	7 11	10 13	7 8	7 17	11 7	7 38	11 2				
S.	12	3 56	1 9	9 7	1 31	9 5	10 33	7 5	10 53	7 1	7 58	10 8	8 16	10 3				
S.	13	4 49	1 54	9 2	2 18	9 0	11 16	6 8	11 45	6 4	8 38	9 9	9 2	9 4				
M.	14	5 41	2 43	8 9	3 9	8 6	—	—	0 17	5 11	9 31	8 10	10 0	8 5				
Tu.	15	6 31	3 35	8 3	4 5	8 1	0 51	5 7	1 30	5 4	10 33	8 2	11 11	7 11				
W.	16	7 19	4 40	7 11	5 18	7 10	2 13	5 3	2 55	5 3	11 51	7 9	—	—				
Th.	17	8 6	5 58	7 9	6 40	7 9	3 36	5 4	4 14	5 6	0 32	7 9	1 14	7 10				
F.	18	8 51	7 19	7 9	7 55	7 11	4 47	5 9	5 16	5 11	1 52	8 0	2 27	8 3				
S.	19	9 34	8 26	8 1	8 48	8 3	5 40	6 1	6 0	6 4	2 57	8 7	3 19	8 11				
S.	20	10 17	9 8	8 6	9 27	8 9	6 19	6 6	6 37	6 9	3 39	9 3	3 55	9 5				
M.	21	10 59	9 43	8 11	9 59	9 0	6 53	6 11	7 10	7 1	4 10	9 11	4 25	10 3				
Tu.	22	11 42	10 15	9 2	10 30	9 3	7 27	7 3	7 44	7 5	4 41	10 6	4 57	10 9				
W.	23	morn.	10 45	9 4	10 59	9 5	7 59	7 6	8 13	7 7	5 13	10 11	5 28	11 1				
Th.	24	0 26	11 15	9 5	11 30	9 5	8 28	7 8	8 43	7 9	5 44	11 2	6 0	11 3				
F.	25	1 11	11 45	9 5	—	—	8 57	7 8	9 12	7 7	6 15	11 2	6 31	11 1				
S.	26	1 59	0 1	9 5	0 18	9 4	9 28	7 6	9 44	7 4	6 48	10 11	7 6	10 9				
S.	27	2 49	0 36	9 3	0 55	9 3	10 0	7 2	10 18	7 0	7 24	10 6	7 42	10 3				
M.	28	3 41	1 15	9 2	1 38	9 1	10 38	6 10	11 0	6 7	8 1	9 11	8 23	9 7				
Tu.	29	4 36	2 2	8 11	2 27	8 9	11 27	6 4	11 59	6 1	8 46	9 4	9 14	9 9				
W.	30	5 32	2 53	8 7	3 23	8 5	—	—	0 37	5 10	9 47	8 9	10 26	8 7				
Th.	31	6 28	3 58	8 3	4 36	8 2	1 20	5 8	2 8	5 8	11 6	8 5	11 50	8 6				
Half Mean Spring Range.			4ft. 9in.				3ft. 10in.				5ft. 7in.							
Phases of the Moon.							Moon's Declination at Noon.											
D. H. M.							M. D.	°	'	M. D.	°	'	M. D.	°	'	M. D.	°	'
Last Quarter-							1	20	S. 23	9	6	N. 14	17	17	N. 12	25	12	S. 43
New - - - -							8	3	59	10	10	53	18	14	31	26	15	5
First Quarter							15	6	7	11	14	46	19	11	16	27	18	25
Full - - - -							23	10	24	12	17	44	20	7	33	28	19	5
Last Quarter-							30	10	20	13	19	39	21	3	32	29	20	2
							6	9	12	14	20	29	22	0	S. 40	30	19	4
In Perigee - -							7	4	10	15	20	18	23	4	54	31	17	4
In Apogee - -							19	8	0	16	19	10	24	8	58			

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—&

BELFAST subtract 2 m.

LONDONDERRY add 4 m.

SLIGO BAY add 9 m.

## MARCH, 1864.

Month Day.	GALWAY.						QUEENSTOWN.						WATERFORD.						D. at Noon.
	MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
	Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
	U. M. F. I.	U. M. F. I.		U. M. F. I.	U. M. F. I.		U. M. F. I.	U. M. F. I.		U. M. F. I.	U. M. F. I.		U. M. F. I.	U. M. F. I.		U. M. F. I.	U. M. F. I.		
1	9 19 11 5	9 51 11 0		9 29 9 7	9 56 9 4		9 43 10 7	10 14 10 4											
2	10 29 10 9	11 13 10 9		10 29 9 2	11 11 9 0		10 52 10 0	11 31 9 10										23.7	
3	11 59 10 11	—		11 56 9 1	—		—	0 13 9 10										24.7	
4	0 44 11 3	1 22 11 9		0 43 9 4	1 25 9 8		0 55 10 1	1 35 10 4										25.7	
5	1 57 12 5	2 25 13 1		2 46 10 1	2 40 10 6		2 14 10 10	2 51 11 4										26.7	
6	2 52 13 9	3 18 14 5		3 8 11 0	3 36 11 6		3 23 11 10	3 54 12 3										27.7	
7	3 41 15 0	4 3 15 6		4 2 11 11	4 26 12 3		4 21 12 8	4 48 13 0										28.7	
8	4 26 16 0	4 48 16 4		4 50 12 7	5 13 12 9		5 13 13 3	5 36 13 5										29.7	
9	5 10 16 6	5 32 16 6		5 36 12 10	5 59 12 10		5 57 13 6	6 19 13 6										30.3	
10	5 54 16 4	6 16 16 1		6 21 12 9	6 42 12 7		6 41 13 5	7 3 13 4										31.3	
11	6 37 15 8	6 58 15 2		7 3 12 4	7 23 12 0		7 24 13 1	7 44 12 10										32.3	
12	7 20 14 7	7 40 14 0		7 43 11 8	8 3 11 3		8 4 12 6	8 22 12 2										33.3	
13	8 2 13 4	8 25 12 8		8 22 10 10	8 42 10 4		8 40 11 9	8 59 11 4										34.3	
14	8 49 11 11	9 15 11 2		9 3 9 11	9 25 9 6		9 18 10 11	9 39 10 6										35.3	
15	9 44 10 7	10 19 10 2		9 49 9 1	10 19 8 9		10 7 10 1	10 42 9 8										36.3	
16	10 59 10 0	11 43 10 0		10 58 8 6	11 40 8 6		11 19 9 4	11 58 9 3										37.3	
17	—	0 25 10 1		—	0 24 8 6		—	0 37 9 3										38.3	
18	1 4 10 4	1 39 10 8		1 4 8 8	1 43 8 11		1 15 9 5	1 52 9 10										39.3	
19	2 9 11 2	2 31 11 7		2 18 9 2	2 45 9 6		2 27 9 11	2 56 10 4										40.3	
20	2 53 12 1	3 12 12 6		3 8 9 10	3 30 10 2		3 23 10 7	3 45 10 11										41.3	
21	3 29 12 11	3 45 13 3		3 48 10 6	4 6 10 9		4 6 11 3	4 26 11 11										42.3	
22	4 1 13 8	4 17 14 0		4 23 11 0	4 40 11 3		4 45 11 9	5 3 11 11										43.3	
23	4 32 14 3	4 46 14 6		4 56 11 5	5 11 11 7		5 19 12 1	5 34 12 2										44.3	
24	5 2 14 8	5 19 14 10		5 28 11 8	5 45 11 9		5 49 12 4	6 6 12 5										45.3	
25	5 35 14 9	5 52 14 8		6 2 11 9	6 19 11 6		6 23 12 5	6 40 12 5										46.3	
26	6 9 14 7	6 26 14 5		6 35 11 8	6 52 11 6		6 57 12 4	7 14 12 3										47.3	
27	6 44 14 2	7 4 13 10		7 10 11 4	7 29 11 2		7 31 12 2	7 49 12 0										48.3	
28	7 24 13 6	7 47 13 1		7 48 10 11	8 7 10 8		8 7 11 10	8 26 11 7										49.3	
29	8 10 12 8	8 35 12 2		8 27 10 5	8 49 10 1		8 45 11 4	9 5 11 12										50.3	
30	9 4 11 8	9 37 11 3		9 15 9 9	9 43 9 6		9 29 10 10	10 0 10 6										51.3	
31	10 15 11 0	10 58 11 0		10 16 9 4	10 57 9 3		10 38 10 3	11 17 10 12										52.3	
Half Mean Spring Range. } 7ft. 5in.						5ft. 10in.						6ft. 2in.							

Half Mean Spring } 7 ft. 5 in.  
Range.

5 ft. 10 in.

6 ft. 2 in.

## Equation of Time at Noon.

M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
1	12 29	Sub.	9	10 38	Sub.	17	8 24	Sub.	25	5 58	Sub.
2	12 17		10	10 22		18	8 6		26	5 39	
3	12 4		11	10 6		19	7 48		27	5 21	
4	11 50		12	9 50		20	7 30		28	5 2	
5	11 37		13	9 33		21	7 12		29	4 44	
6	11 22		14	9 16		22	6 54		30	4 26	
7	11 8		15	8 59		23	6 35		31	4 7	
8	10 53		16	8 42		24	6 17				

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 8 m.



APRIL, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFT.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
F.	1	7 m 25	6 12	8 4	6 55	8 4	5 34	20 5	6 22	20 8	—	—	0 3	—
S.	2	8 20	7 38	8 6	8 18	8 8	7 8	21 3	7 46	22 0	1 23	16 4	2	—
S.	3	9 14	8 54	8 11	9 25	9 2	8 22	22 11	8 50	23 10	2 47	17 9	3 2	—
M.	4	10 7	9 53	9 5	10 20	9 7	9 16	24 9	9 40	25 7	3 51	19 7	4 2	—
Tu.	5	11 1	10 45	9 9	11 10	9 11	10 2	26 4	10 25	26 10	4 47	21 1	5 1	—
W.	6	11 54	11 35	10 0	11 59	10 1	10 49	27 3	11 11	27 6	5 40	22 1	6	—
Th.	7	ora 48	—	—	0 21	10 2	11 33	27 9	11 55	27 8	6 25	22 6	6 4	—
F.	8	1 42	0 43	10 2	1 4	10 2	—	—	0 16	27 6	7 5	22 4	7 2	—
S.	9	2 36	1 25	10 1	1 46	9 11	0 36	27 1	0 56	26 7	7 46	21 6	8	—
S.	10	3 30	2 6	9 10	2 25	9 8	1 15	25 11	1 35	25 2	8 26	20 4	8 4	—
M.	11	4 22	2 44	9 5	3 4	9 3	1 55	24 5	2 15	23 6	9 6	18 11	9 2	—
Tu.	12	5 12	3 24	9 0	3 46	8 10	2 35	22 7	2 57	21 10	9 46	17 5	10	—
W.	13	6 0	4 9	8 7	4 35	8 5	3 20	20 11	3 47	20 3	10 30	16 0	10 5	—
Th.	14	6 46	5 4	8 3	5 35	8 1	4 19	19 7	4 53	19 1	11 22	14 10	11 5	—
F.	15	7 30	6 11	8 0	6 48	7 11	5 34	19 0	6 15	19 2	—	—	0 2	—
S.	16	8 13	7 26	7 11	8 1	8 1	6 56	19 5	7 30	19 10	1 9	14 9	1 4	—
S.	17	8 55	8 35	8 3	9 5	8 5	8 3	20 5	8 32	21 0	2 26	15 7	2 5	—
M.	18	9 38	9 30	8 7	9 53	8 9	8 54	21 8	9 16	22 4	3 25	16 9	3 5	—
Tu.	19	10 21	10 14	8 11	10 33	9 0	9 34	23 0	9 52	23 7	4 13	18 1	4 3	—
W.	20	11 6	10 51	9 2	11 9	9 3	10 8	24 1	10 24	24 7	4 54	19 2	5 1	—
Th.	21	11 54	11 29	9 4	11 48	9 5	10 44	24 11	11 0	25 2	5 33	20 0	5 5	—
F.	22	morn.	—	—	0 7	9 6	11 18	25 6	11 37	25 8	6 10	20 6	6 2	—
S.	23	0 44	0 26	9 7	0 44	9 8	11 56	25 9	—	—	6 46	20 10	7	—
S.	24	1 36	1 3	9 8	1 22	9 8	0 14	25 9	0 33	25 9	7 22	20 9	7 4	—
M.	25	2 31	1 41	9 8	1 59	9 7	0 51	25 6	1 10	25 3	8 0	20 4	8 2	—
Tu.	26	3 28	2 19	9 6	2 40	9 5	1 30	24 10	1 50	24 5	8 42	19 8	9	—
W.	27	4 24	3 2	9 4	3 26	9 2	2 13	23 10	2 37	23 3	9 28	18 8	9 5	—
Th.	28	5 20	3 52	9 1	4 20	8 11	3 3	22 9	3 31	22 2	10 17	17 9	10 4	—
F.	29	6 14	4 51	8 10	5 26	8 8	4 4	21 7	4 42	21 3	11 14	16 9	11 4	—
S.	30	7 8	6 2	8 7	6 40	8 7	5 23	21 2	6 5	21 5	—	—	0 2	—

Half Mean Spring } 4ft. 10in.

13ft. 0in.

10ft. 6in.

## Phases of the Moon.

## Moon's Declination at Noon.

	D.	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
New	6	1	49	Afternoon.	1	14	8.44	9	18	N. 51	17	4	N. 42	25		
First Quarter	14	0	9	Morning.	2	10	45	10	20	8	18	0	34	26		
Full	22	1	19	Morning.	3	6	6	11	20	18	19	3	39	27		
Last Quarter	29	4	34	Morning.	4	1	3	12	19	28	20	7	47	28		
					5	4	N. 3	13	17	44	21	11	39	29		
In Perigee	4	6	0	Morning.	6	8	52	14	15	16	22	15	4	30		
In Apogee	16	2	0	Morning.	7	13	6	15	12	10	23	17	47			
					8	16	29	16	8	37	24	19	35			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

GREENOCK add 19 m.

LIVERPOOL add 12 m.

PEMBROKE add 20 m.

APRIL, 1864.

DOVER.					SHEERNESS.					LONDON.					C's Age AT NOON.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. P. L.	Height. F. I.	Time. H. M. P. L.	Height. F. I.	Time. H. M. P. L.	Height. F. I.	Time. H. M. P. L.	Height. F. I.	Time. H. M. P. L.	Height. F. I.	Time. H. M. P. L.	Height. F. I.	Time. H. M. P. L.	Height. F. I.		
5 20 14 9	6 0 14 10	6 50 13 2	7 34 13 3	8 15 16 3	9 2 16 2	24.3									
6 39 15 2	7 19 15 9	8 20 13 5	9 4 13 9	9 45 16 2	10 30 16 5	25.3									
7 57 16 5	8 28 17 1	9 43 14 2	10 18 14 8	11 12 16 9	11 46 17 2	26.3									
8 56 17 9	9 23 18 4	10 47 15 2	11 14 15 7	—	0 17 17 8	27.3									
9 48 18 10	10 13 19 3	11 37 16 0	12 0 16 4	0 44 18 2	1 8 18 8	28.3									
10 38 19 8	11 2 19 10	—	0 23 16 8	1 33 19 1	1 54 19 6	●									
11 26 19 11	11 49 19 11	0 47 16 10	1 10 17 0	2 15 19 9	2 38 20 0	0.9									
—	0 11 19 9	1 30 17 1	1 51 17 0	2 59 20 1	3 20 20 1	1.9									
0 33 19 6	0 56 19 2	2 10 16 10	2 30 16 7	3 41 20 0	4 0 19 10	2.9									
1 18 18 9	1 39 18 4	2 50 16 4	3 8 16 0	4 21 19 7	4 40 19 3	3.9									
1 59 17 11	2 31 17 3	3 28 15 8	3 48 15 3	4 59 18 10	5 19 18 5	4.9									
2 43 16 7	3 4 16 0	4 9 14 9	4 31 14 3	5 40 17 11	6 2 17 5	5.9									
3 26 15 5	3 52 14 11	4 53 13 10	5 18 13 5	6 25 17 0	6 50 16 6	6.9									
4 18 14 4	4 46 13 11	5 47 13 1	6 19 12 9	7 15 16 1	7 47 15 9	7.9									
5 19 13 8	5 52 13 8	6 54 12 7	7 34 12 6	8 22 15 6	9 1 15 4	8.9									
6 27 13 10	7 2 14 2	8 14 12 7	8 52 12 10	9 40 15 4	10 17 15 5	9.9									
7 37 14 7	8 8 15 1	9 27 13 1	10 0 13 5	10 53 15 7	11 27 15 10	10.9									
8 32 15 6	8 55 16 0	10 28 13 9	10 51 14 1	11 57 16 2	—	11.9									
9 16 16 5	9 35 16 10	11 14 14 5	11 32 14 8	0 21 16 6	0 42 16 10	12.9									
9 54 17 3	10 12 17 7	11 50 15 0	—	1 1 17 3	1 19 17 7	13.9									
10 31 17 10	10 50 18 1	0 7 15 3	0 23 15 6	1 38 17 11	1 54 18 2	14.9									
11 9 18 4	11 30 18 5	0 41 15 8	0 59 15 10	2 12 18 5	2 28 18 8	15.9									
11 50 18 6	—	1 16 16 0	1 34 16 1	2 46 18 10	3 3 19 0	16.9									
0 10 18 6	0 30 18 6	1 52 16 0	2 9 15 11	3 21 19 1	3 38 19 1	17.9									
0 50 18 5	1 11 18 3	2 27 15 11	2 44 15 10	3 57 19 1	4 15 18 11	18.9									
1 33 18 1	1 55 17 11	3 3 15 8	3 23 15 6	4 34 18 10	4 56 18 8	19.9									
2 19 17 6	2 44 17 1	3 44 15 3	4 7 14 11	5 15 18 5	5 38 18 1	20.9									
3 10 16 8	3 37 16 3	4 33 14 7	5 0 14 4	6 3 17 10	6 31 17 6	21.9									
4 7 15 10	4 38 15 6	5 30 14 1	6 4 13 9	6 59 17 2	7 32 16 11	22.9									
5 11 15 4	5 45 15 4	6 43 13 6	7 23 13 7	8 9 16 8	8 50 16 7	23.9									
Mean Spring } 9ft. 4in.					8ft. 0in.					9ft. 7in.					
Range.															

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
3 49	Sub.	9	1 30	Sub.	17	0 33	Add.	25	2 12	Add.
3 31		10	1 14		18	0 47		26	2 22	
3 13		11	0 57		19	1 0		27	2 31	
2 56		12	0 42		20	1 13		28	2 41	
2 38		13	0 26		21	1 26		29	2 49	
2 21		14	0 11		22	1 38		30	2 57	
2 4		15	0 4	Add.	23	1 50				
1 47		16	0 19		24	2 1				

es of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.



APRIL, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY																																			
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																																
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																															
			H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.																									
F.	1	7m25	5	17	8	2	5	58	8	2	2	54	5	9	3	36	6	0	—	—	—	0	31	0	31	0																								
S.	2	8 20	6	40	8	3	7	18	8	4	4	13	6	4	4	43	6	7	1	14	8	10	1	51	1	51																								
Mo.	3	9 14	7	52	8	6	8	20	8	10	5	9	6	10	5	33	7	2	2	25	9	6	2	51	2	51																								
M.	4	10 7	8	45	9	1	9	9	9	4	5	56	7	5	6	20	7	8	3	16	10	5	3	38	3	38																								
Tu.	5	11 1	9	32	9	6	9	55	9	8	6	43	7	10	7	7	8	0	3	59	11	3	4	21	4	21																								
W.	6	11 54	10	18	9	9	10	40	9	10	7	31	8	2	7	54	8	3	4	44	11	9	5	8	5	8																								
Th.	7	oa48	11	0	9	10	11	20	9	10	8	14	8	4	8	33	8	3	5	30	12	1	5	50	6	50																								
F.	8	1 42	11	39	9	9	11	59	9	8	8	51	8	2	9	10	8	0	6	9	11	10	6	25	7	25																								
S.	9	2 36	—	—	—	—	0	20	9	6	9	29	7	9	9	48	7	6	6	50	11	4	7	1	7	1																								
Mo.	10	3 30	0	42	9	5	1	4	9	3	10	7	7	3	10	27	6	11	7	31	10	6	7	51	8	51																								
M.	11	4 22	1	26	9	1	1	49	8	11	10	49	6	7	11	14	6	3	8	11	9	8	8	34	9	34																								
Tu.	12	5 12	2	14	8	8	2	39	8	6	11	43	6	0	—	—	—	—	8	58	8	10	9	27	10	27																								
W.	13	6 0	3	4	8	3	3	34	8	2	0	15	5	8	0	53	5	5	10	0	8	3	10	35	11	35																								
Th.	14	6 46	4	6	8	0	4	40	7	11	1	33	5	4	2	14	5	3	11	11	7	11	11	49	12	49																								
F.	15	7 30	5	16	7	10	5	51	7	10	2	54	5	4	3	29	5	6	—	—	—	—	0	25	13	25																								
S.	16	8 13	6	28	7	10	7	2	7	11	4	2	5	8	4	31	5	11	1	2	8	0	1	35	14	35																								
Mo.	17	8 55	7	35	8	0	8	2	8	2	4	57	6	1	5	19	6	3	2	7	8	5	2	35	15	35																								
M.	18	9 38	8	24	8	4	8	46	8	6	5	38	6	5	5	57	6	7	2	56	9	0	3	17	16	17																								
Tu.	19	10 21	9	4	8	9	9	22	8	11	6	14	6	9	6	32	6	11	3	34	9	8	3	50	17	50																								
W.	20	11 6	9	39	9	1	9	55	9	2	6	50	7	1	7	8	7	3	4	5	10	3	4	21	18	21																								
Th.	21	11 54	10	12	9	3	10	30	9	4	7	26	7	4	7	44	7	6	4	39	10	9	4	57	19	57																								
F.	22	morn.	10	47	9	5	11	5	9	5	8	0	7	7	8	18	7	8	5	15	11	1	5	33	20	33																								
S.	23	0 44	11	21	9	5	11	38	9	4	8	34	7	8	8	50	7	7	5	51	11	2	6	8	21	8																								
Mo.	24	1 36	11	56	9	4	—	—	—	—	9	7	7	6	9	24	7	5	6	26	11	0	6	45	22	45																								
M.	25	2 31	0	16	9	4	0	36	9	3	9	43	7	3	10	2	7	1	7	5	10	8	7	26	23	26																								
Tu.	26	3 28	0	58	9	2	1	22	9	1	10	23	6	11	10	46	6	9	7	47	10	1	8	5	24	5																								
W.	27	4 24	1	47	9	0	2	16	8	10	11	16	6	6	11	51	6	3	8	36	9	6	9	6	25	6																								
Th.	28	5 20	2	46	8	8	3	17	8	6	—	—	—	—	0	29	6	0	9	40	9	0	10	18	26	18																								
F.	29	6 14	3	51	8	5	4	29	8	5	1	12	5	11	2	0	5	11	10	59	8	9	11	40	27	40																								
S.	30	7 8	5	7	8	4	5	44	8	4	2	44	6	0	3	22	6	3	—	—	—	—	0	17	28	17																								
Half Mean Spring } Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.																																			
Phases of the Moon.																									Moon's Declination at Noon.																									
D. H. M.																									M.D. ° ' "																									
New	6	1	49	Afternoon.																						M.D. ° ' "																								
First Quarter	14	0	9	Morning.																						M.D. ° ' "																								
Full	22	1	19	Morning.																						M.D. ° ' "																								
Last Quarter	29	4	34	Morning.																						M.D. ° ' "																								
In Perigee	4	6	0	Morning.																						M.D. ° ' "																								
In Apogee	16	2	0	Morning.																						M.D. ° ' "																								

The times for High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 2 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 s.

APRIL, 1864.

NORTH SHIELDS.					LEITH.					THURSO.					D. AGE AT NOON.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.			
10 17 10 1	11 0 10 3	9 10 12 9	10 35 13 3	9 55 12 11	3 2 9 8	3 52 9 10	24.3								
11 42 10 7	—	—	—	—	4 35 10 0	5 13 10 4	25.3								
0 18 11 0	0 50 11 6	11 44 14 2	—	—	5 46 10 10	6 13 11 5	26.3								
1 17 11 11	1 42 12 5	0 11 14 9	0 36 15 4	6 36 12 1	6 58 12 9	27.3									
2 6 12 11	2 28 13 4	1 0 15 11	1 23 16 5	7 17 13 4	7 37 13 10	28.3									
2 49 13 8	3 11 14 0	1 46 16 10	2 9 17 2	7 58 14 2	8 19 14 4	●									
3 33 14 2	3 54 14 3	2 32 17 4	2 52 17 5	8 39 14 5	8 59 14 3	0.9									
4 15 14 2	4 35 14 0	3 11 17 4	3 30 17 2	9 19 14 1	9 40 13 10	1.9									
4 56 13 8	5 17 13 4	3 50 16 10	4 11 16 5	10 1 13 5	10 22 13 0	2.9									
5 38 13 0	5 59 12 7	4 32 16 0	4 53 15 7	10 43 12 6	11 5 12 0	3.9									
6 19 12 3	6 41 11 9	5 14 15 2	5 36 14 8	11 28 11 5	11 51 10 10	4.9									
7 3 11 3	7 27 10 10	6 0 14 1	6 24 13 6	—	—	5.9									
7 54 10 3	8 26 9 10	6 49 13 0	7 21 12 7	0 41 9 11	1 11 9 6	6.9									
9 0 9 6	9 37 9 4	7 54 12 3	8 29 12 0	1 45 9 2	2 21 8 11	7.9									
10 17 9 4	10 54 9 5	9 10 11 11	9 48 12 0	3 3 8 10	3 45 8 10	8.9									
11 30 9 7	—	10 23 12 2	10 56 12 4	4 23 8 11	4 57 9 1	9.9									
0 3 9 10	0 34 10 2	11 27 12 8	11 54 13 0	5 29 9 4	5 56 9 9	10.9									
1 0 10 5	1 22 10 9	—	—	6 18 10 2	6 38 10 7	11.9									
1 43 11 1	2 1 11 5	0 37 13 10	0 54 14 3	6 55 11 1	7 10 11 6	12.9									
2 18 11 9	2 34 12 1	1 12 14 8	1 29 15 1	7 23 12 0	7 37 12 5	13.9									
2 49 12 5	3 5 12 8	1 46 15 5	2 3 15 8	7 52 12 8	8 8 12 11	14.9									
3 22 12 10	3 39 13 0	2 21 15 11	2 38 16 1	8 25 13 1	8 43 13 2	○									
3 57 13 1	4 15 13 1	2 55 16 2	3 12 16 2	9 0 13 2	9 18 13 1	16.9									
4 34 13 0	4 53 12 11	3 29 16 1	3 47 15 11	9 37 13 0	9 56 12 10	17.9									
5 12 12 9	5 31 12 7	4 6 15 9	4 26 15 7	10 16 12 7	10 38 12 4	18.9									
5 53 12 5	6 15 12 3	4 48 15 5	5 10 15 2	11 1 12 0	11 26 11 8	19.9									
6 39 11 11	7 5 11 8	5 34 14 10	6 2 14 6	11 54 11 3	—	—	20.9								
7 35 11 3	8 7 10 11	6 31 14 1	7 2 13 9	0 23 10 11	0 54 10 8	21.9									
8 43 10 8	9 24 10 6	7 38 13 5	8 18 13 3	1 28 10 4	2 9 10 3	22.9									
10 7 10 6	10 45 10 8	8 59 13 3	9 40 13 5	2 51 10 2	3 36 10 3	23.9									
Mean Spring Range. } 6ft. 8in.					8ft. 2in.					6ft. 7in.					

Equation of Time at Noon.

M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
3 49	Sub.	9	1 30	Sub.	17	0 33	Add.	25	2 12	Add.
3 31		10	1 14		18	0 47		26	2 22	
3 13		11	0 57		19	1 0		27	2 31	
2 56		12	0 42		20	1 13		28	2 41	
2 38		13	0 26		21	1 26		29	2 49	
2 21		14	0 11		22	1 38		30	2 57	
2 4		15	0 4	Add.	23	1 50				
1 47		16	0 19		24	2 1				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
 NORTH SHIELDS add 6 m. LEITH add 13 m. THURSO add 14 m.

MAY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			H. M.	Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	Time.	Height.																				
Mon.	1	8 mo	11 42	15 7	—	—	—	—	0 35	13 4	1 17	13 0	6 52	10 8	7 29	10 1	—	—	—	—																					
M.	2	8 51	0 15	16 1	0 45	16 8	1 55	13 11	2 32	13 10	8 4	11 4	8 36	10 1	9 34	10 1	—	—	—	—																					
Tu.	3	9 43	1 15	17 3	1 40	17 10	3 3	14 9	3 30	14 8	9 7	12 0	9 34	10 1	10 26	10 1	—	—	—	—																					
W.	4	10 35	2 5	18 5	2 30	18 11	3 57	15 3	4 23	15 3	10 0	12 5	10 26	10 1	11 11	10 1	—	—	—	—																					
Th.	5	11 28	2 53	19 3	3 15	19 6	4 48	15 7	5 12	15 8	10 49	12 9	11 11	10 1	12 54	10 1	—	—	—	—																					
F.	6	0 a 23	3 36	19 6	3 58	19 5	5 33	15 9	5 54	15 9	11 32	12 10	11 54	10 1	0 17	10 1	—	—	—	—																					
S.	7	1 17	4 20	19 3	4 40	19 0	6 15	15 8	6 36	15 8	—	—	0 17	10 1	—	—	—	—	—	—																					
Mon.	8	2 10	4 59	18 8	5 19	18 3	6 54	15 4	7 12	15 5	0 39	12 7	0 59	10 1	—	—	—	—	—	—																					
M.	9	3 2	5 37	17 10	5 57	17 5	7 30	14 9	7 47	14 10	1 19	12 3	1 39	10 1	—	—	—	—	—	—																					
Tu.	10	3 52	6 18	16 11	6 39	16 3	8 5	14 0	8 23	14 2	1 58	11 10	2 20	10 1	—	—	—	—	—	—																					
W.	11	4 39	6 59	15 8	7 22	15 1	8 40	13 2	8 58	13 5	2 40	11 4	3 0	10 1	—	—	—	—	—	—																					
Th.	12	5 24	7 45	14 6	8 9	14 1	9 18	12 5	9 40	12 8	3 21	10 10	3 43	10 1	—	—	—	—	—	—																					
F.	13	6 8	8 36	13 8	9 4	13 5	10 3	11 9	10 30	12 1	4 6	10 5	4 33	10 1	—	—	—	—	—	—																					
S.	14	6 50	9 37	13 4	10 11	13 4	10 57	11 4	11 32	11 11	5 0	10 0	5 30	10 1	—	—	—	—	—	—																					
Mon.	15	7 32	10 46	13 6	11 18	13 9	—	—	0 9	11 6	6 3	9 10	6 35	10 1	—	—	—	—	—	—																					
M.	16	8 15	11 50	14 1	—	—	0 45	12 2	1 20	12 1	7 7	10 0	7 58	10 1	—	—	—	—	—	—																					
Tu.	17	8 59	0 20	14 6	0 46	14 11	1 54	12 10	2 26	12 10	8 8	10 6	8 37	10 1	—	—	—	—	—	—																					
W.	18	9 45	1 12	15 5	1 35	16 0	2 53	13 6	3 20	13 7	9 3	11 0	9 27	10 1	—	—	—	—	—	—																					
Th.	19	10 34	1 56	16 6	2 16	17 0	3 43	14 0	4 6	14 3	9 50	11 7	10 11	10 1	—	—	—	—	—	—																					
F.	20	11 27	2 35	17 6	2 55	18 0	4 29	14 6	4 51	14 9	10 31	12 0	10 51	10 1	—	—	—	—	—	—																					
S.	21	morn.	3 16	18 4	3 37	18 7	5 11	14 11	5 31	15 3	11 12	12 3	11 33	10 1	—	—	—	—	—	—																					
Mon.	22	0 22	3 59	18 9	4 20	18 10	5 52	15 3	6 13	15 7	11 55	12 6	—	10 1	—	—	—	—	—	—																					
M.	23	1 19	4 39	18 11	4 59	18 10	6 34	15 4	6 54	15 8	0 16	12 6	0 38	10 1	—	—	—	—	—	—																					
Tu.	24	2 17	5 21	18 8	5 43	18 7	7 14	15 2	7 34	15 7	0 59	12 6	1 21	10 1	—	—	—	—	—	—																					
W.	25	3 15	6 6	18 4	6 31	18 0	7 56	14 10	8 19	15 3	1 44	12 4	2 7	10 1	—	—	—	—	—	—																					
Th.	26	4 11	6 56	17 6	7 24	17 0	8 42	14 5	9 7	14 9	2 32	12 2	2 58	10 1	—	—	—	—	—	—																					
F.	27	5 5	7 54	16 6	8 24	16 0	9 34	13 10	10 1	14 1	3 24	11 9	3 52	10 1	—	—	—	—	—	—																					
S.	28	5 57	8 55	15 8	9 26	15 5	10 29	13 2	11 1	13 7	4 21	11 4	4 51	10 1	—	—	—	—	—	—																					
Mon.	29	6 48	10 1	15 5	10 37	15 6	11 33	12 10	—	—	5 21	11 0	5 54	10 1	—	—	—	—	—	—																					
M.	30	7 38	11 12	15 7	11 45	15 10	0 11	13 5	0 51	13 1	6 27	10 10	7 0	10 1	—	—	—	—	—	—																					
T.	31	8 29	—	—	0 16	16 1	1 28	13 9	2 3	13 7	7 33	11 1	8 0	10 1	—	—	—	—	—	—																					
Half Mean Spring Range.			9 ft. 6 in.						7 ft. 9 in.						6 ft. 4 in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
D. H. M.																					M.D. ° '																				
New - - - - 6 0 14 Morning.																					1 28. 33 9 19 N. 50 17 6 S. 23 25																				
First Quarter - 13 6 21 Afternoon.																					2 2 N. 24 10 18 24 18 10 21 26																				
Full - - - - 21 1 24 Afternoon.																					3 7 13 11 16 8 19 13 57 27																				
Last Quarter - 28 9 21 Morning.																					4 11 35 12 13 13 20 16 57 28																				
																					5 15 16 13 9 48 21 19 7 29																				
In Perigee - - 1 11 0 Morning.																					6 18 1 14 6 0 22 20 13 30																				
In Apogee - - 13 9 0 Afternoon.																					7 19 43 15 1 57 23 20 7 31																				
In Perigee - - 26 0 0 Noon.																					8 20 19 16 2 S. 14 24 18 44																				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 16 m.

APRIL, 1864.

WEEK DAY.	MONTH.	DAY.	WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age at Noon.
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
			H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.	
		1	0 31 29	2	1 14 29	6	4 43 12	9	5 28 13	0	5 35 8	11	6 17 9	1	24.3
		2	1 59 30	0	2 40 30	11	6 9 13	4	6 45 13	9	6 56 9	3	7 32 9	7	25.3
		3	3 20 32	2	3 56 33	5	7 18 14	3	7 46 14	9	8 7 9	10	8 37 10	2	26.3
		4	4 30 34	10	5 13 36	2	8 12 15	4	8 36 15	10	9 6 10	6	9 34 10	9	27.3
		5	5 28 37	4	5 55 38	3	8 58 16	3	9 19 16	7	9 57 11	0	10 19 11	3	28.3
		6	6 21 39	0	6 45 39	4	9 42 16	10	10 5 17	0	10 40 11	5	11 1 11	6	●
		7	7 7 39	7	7 29 39	8	10 24 17	1	10 42 17	0	11 21 11	7	11 42 11	6	0.9
		8	7 49 39	4	8 9 38	11	11 1 16	10	11 20 16	7	—	—	0 3 11	5	1.9
		9	8 29 38	3	8 48 37	5	11 41 16	3	—	—	0 24 11	3	0 45 11	0	2.9
		10	9 6 36	6	9 24 35	6	0 3 15	11	0 25 15	6	1 6 10	9	1 28 10	6	3.9
		11	9 41 34	3	9 59 32	11	0 47 15	0	1 10 14	5	1 48 10	3	2 10 9	11	4.9
		12	10 16 31	9	10 34 30	6	1 33 13	11	1 57 13	5	2 33 9	8	2 56 9	5	5.9
		13	10 57 29	5	11 24 28	5	2 22 13	0	2 52 12	7	3 21 9	2	3 51 8	11	6.9
		14	11 55 27	7	—	—	3 26 12	3	4 2 12	0	4 24 8	8	4 59 8	6	7.9
		15	0 31 27	2	1 8 27	2	4 43 11	11	5 21 12	0	5 35 8	5	6 10 8	6	8.9
		16	1 47 27	5	2 23 27	11	5 57 12	3	6 30 12	6	6 44 8	8	7 17 8	10	9.9
		17	2 58 28	7	3 32 29	5	7 1 12	9	7 28 13	1	7 48 9	0	8 17 9	3	10.9
		18	4 0 30	4	4 28 31	3	7 50 13	5	8 12 13	10	8 42 9	5	9 5 9	8	11.9
		19	4 52 32	4	5 15 33	3	8 30 14	3	8 47 14	7	9 27 9	10	9 46 10	1	12.9
		20	5 35 34	2	5 54 34	11	9 3 14	11	9 19 15	2	10 3 10	3	10 18 10	5	13.9
		21	6 14 35	6	6 33 35	11	9 36 15	5	9 54 15	7	10 34 10	7	10 51 10	9	14.9
		22	6 52 36	4	7 12 36	8	10 10 15	9	10 27 15	10	11 8 10	10	11 26 10	11	○
		23	7 30 36	11	7 48 36	11	10 43 15	11	11 0 15	10	11 43 10	11	—	—	16.9
		24	8 6 36	11	8 24 36	8	11 17 15	9	11 37 15	8	0 2 10	10	0 21 10	9	17.9
		25	8 42 36	5	9 1 36	0	11 57 15	6	—	—	0 40 10	8	1 0 10	7	18.9
		26	9 20 35	7	9 40 34	9	0 19 15	3	0 43 15	0	1 22 10	5	1 44 10	3	19.9
		27	10 1 33	11	10 22 33	1	1 8 14	8	1 35 14	4	2 8 10	0	2 35 9	10	20.9
		28	10 45 32	3	11 12 31	4	2 4 14	0	2 35 13	8	3 3 9	8	3 33 9	6	21.9
		29	11 46 30	9	—	—	3 9 13	5	3 50 13	3	4 8 9	4	4 48 9	3	22.9
		30	0 22 30	5	0 59 30	6	4 32 13	3	5 13 13	5	5 26 9	2	6 3 9	3	23.9

Half Mean Spring } 18 ft. 7 in.  
Range.

8 ft. 0 in.

5 ft. 6 in.

## Equation of Time at Noon.

M. D.	M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
1	3 49	Sub.	9	1 30	Sub.	17	0 33	Add.	25	2 12	Add.
2	3 31		10	1 14		18	0 47		26	2 22	
3	3 13		11	0 57		19	1 0		27	2 31	
4	2 56		12	0 42		20	1 13		28	2 41	
5	2 38		13	0 26		21	1 26		29	2 49	
6	2 21		14	0 11		22	1 38		30	2 57	
7	2 4		15	0 4	Add.	23	1 50				
8	1 47		16	0 19		24	2 1				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

TIDE TABLES FOR THE

APRIL, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.		
			Time.		Height.	Time.		Height.	Time.		Height.	Time.		Height.	Time.		Height.	Time.		Height.
			H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	H. M.	F. I.	H. M.
F.	1	7m25	5	17	8 2	5	58	8 2	2	54	5 9	3	36	6 0	—	—	—	—	0 32	
S.	2	8 20	6	40	8 3	7	18	8 4	4	13	6 4	4	43	6 7	1	14	8 10	1	51	
Sp.	3	9 14	7	52	8 6	8	20	8 10	5	9	6 10	5	33	7 2	2	25	9 6	2	51	
M.	4	10 7	8	45	9 1	9	9	9 4	5	56	7 5	6	20	7 8	3	16	10 5	3	38	
Tu.	5	11 1	9	32	9 6	9	55	9 8	6	43	7 10	7	7	8 0	3	59	11 3	4	21	
W.	6	11 54	10	18	9 9	10	40	9 10	7	31	8 2	7	54	8 3	4	44	11 9	5	8	
Th.	7	0a48	11	0	9 10	11	20	9 10	8	14	8 4	8	33	8 3	5	30	12 1	5	56	
F.	8	1 42	11	39	9 9	11	59	9 8	8	51	8 2	9	10	8 0	6	9	11 10	6	29	
S.	9	2 36	—	—	—	0	20	9 6	9	29	7 9	9	48	7 6	6	50	11 4	7	1	
Sp.	10	3 30	0	42	9 5	1	4	9 3	10	7	7 3	10	27	6 11	7	31	10 6	7	51	
M.	11	4 22	1	26	9 1	1	49	8 11	10	49	6 7	11	14	6 3	8	11	9 8	8	34	
Tu.	12	5 12	2	14	8 8	2	39	8 6	11	43	6 0	—	—	—	8	58	8 10	9	27	
W.	13	6 0	3	4	8 3	3	34	8 2	0	15	5 8	0	53	5 5	10	0	8 3	10	35	
Th.	14	6 46	4	6	8 0	4	40	7 11	1	33	5 4	2	14	5 3	11	11	7 11	11	49	
F.	15	7 30	5	16	7 10	5	51	7 10	2	54	5 4	3	29	5 6	—	—	—	—	0 25	
S.	16	8 13	6	28	7 10	7	2	7 11	4	2	5 8	4	31	5 11	1	2	8 0	1	35	
Sp.	17	8 55	7	35	8 0	8	2	8 2	4	57	6 1	5	19	6 3	2	7	8 5	2	35	
M.	18	9 38	8	24	8 4	8	46	8 6	5	38	6 5	5	57	6 7	2	56	9 0	3	17	
Tu.	19	10 21	9	4	8 9	9	22	8 11	6	14	6 9	6	32	6 11	3	34	9 8	3	50	
W.	20	11 6	9	39	9 1	9	55	9 2	6	50	7 1	7	8	7 3	4	5	10 3	4	21	
Th.	21	11 54	10	12	9 3	10	30	9 4	7	26	7 4	7	44	7 6	4	39	10 9	4	57	
F.	22	morn.	10	47	9 5	11	5	9 5	8	0	7 7	8	18	7 8	5	15	11 1	5	33	
S.	23	0 44	11	21	9 5	11	38	9 4	8	34	7 8	8	50	7 7	5	51	11 2	6	8	
Sp.	24	1 36	11	56	9 4	—	—	—	9	7	7 6	9	24	7 5	6	26	11 0	6	45	
M.	25	2 31	0	16	9 4	0	36	9 3	9	43	7 3	10	2	7 1	7	5	10 8	7	26	
Tu.	26	3 28	0	58	9 2	1	22	9 1	10	23	6 11	10	46	6 9	7	47	10 1	8	9	
W.	27	4 24	1	47	9 0	2	16	8 10	11	16	6 6	11	51	6 3	8	36	9 6	9	6	
Th.	28	5 20	2	46	8 8	3	17	8 6	—	—	—	0	29	6 0	9	40	9 0	10	18	
F.	29	6 14	3	51	8 5	4	29	8 5	1	12	5 11	2	0	5 11	10	59	8 9	11	40	
S.	30	7 8	5	7	8 4	5	44	8 4	2	44	6 0	3	22	6 3	—	—	—	—	0 17	
Half Mean Spring Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.					
Phases of the Moon.									Moon's Declination at Noon.											
			D.	H.	M.					M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°
New	—	—	6	1	49	Afternoon.				1	14	S. 44	9	18	N. 51	17	4	N. 42	25	2
First Quarter	—	—	14	0	9	Morning.				2	10	45	10	20	8	18	0	34	26	10
Full	—	—	22	1	19	Morning.				3	6	6	11	20	18	19	3	S. 39	27	18
Last Quarter	—	—	29	4	34	Morning.				4	1	3	12	19	28	20	7	47	28	1
In Perigee	—	—	4	6	0	Morning.				5	4	N. 3	13	17	44	21	11	39	29	1
In Apogee	—	—	16	2	0	Morning.				6	8	52	14	15	16	22	15	4	30	—
											7	13	6	15	12	10	23	17	47	—
											8	16	29	16	8	37	24	19	35	—

The times for High Water are given for Mean Time at Place ; if Dublin or Railway Time be required BELFAST subtract 3 m. LONDONDERRY add 4 m. SLIGO BAY add 9 m.

APRIL, 1864.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.		Time. H. M. F. L.	Height. F. L.	Time. H. M. F. L.	Height. F. L.	D.	
11 43	11 3	—	—		11 40	9 4	—	—		11 58	10 1	—	—	24 3	
0 26	11 7	1 3	12 0		0 24	9 6	1 4	9 10		0 37	10 3	1 15	10 7	25 3	
1 36	12 7	2 3	13 3		1 44	10 2	2 16	10 7		1 52	10 11	2 27	11 4	26 3	
2 30	13 10	2 56	14 4		2 45	11 0	3 14	11 5		3 0	11 9	3 30	12 2	27 3	
3 19	14 10	3 42	15 3		3 39	11 9	4 4	12 1		3 57	12 6	4 24	12 10	28 3	
4 5	15 7	4 27	15 9		4 28	12 3	4 51	12 5		4 51	13 0	5 14	13 1	●	
4 48	15 11	5 9	15 11		5 13	12 6	5 35	12 6		5 35	13 2	5 56	13 2	0 9	
5 29	15 9	5 50	15 6		5 56	12 5	6 17	12 3		6 17	13 1	6 38	12 11	1 9	
6 11	15 2	6 31	14 9		6 38	12 0	6 58	11 9		6 58	12 9	7 18	12 6	2 9	
6 52	14 3	7 13	13 9		7 18	11 5	7 37	11 1		7 38	12 3	7 57	12 0	3 9	
7 35	13 2	7 58	12 6		7 57	10 8	8 16	10 3		8 16	11 8	8 35	11 3	4 9	
8 21	11 11	8 46	11 3		8 36	9 11	8 58	9 7		8 53	10 11	9 13	10 7	5 9	
9 14	10 10	9 45	10 5		9 22	9 3	9 49	9 0		9 38	10 3	10 8	9 11	6 9	
10 19	10 2	10 58	10 1		10 19	8 9	10 56	8 8		10 41	9 7	11 17	9 5	7 9	
11 37	10 2	—	—		11 34	8 8	—	—		11 51	9 4	—	—	8 9	
0 14	10 4	0 47	10 7		0 11	8 9	0 47	8 11		0 25	9 6	0 58	9 8	9 9	
1 19	11 0	1 46	11 5		1 22	9 1	1 55	9 4		1 31	9 10	2 3	10 1	10 9	
2 8	11 9	2 29	12 2		2 21	9 7	2 45	9 11		2 31	10 5	2 58	10 9	11 9	
2 49	12 8	3 8	13 0		3 7	10 3	3 26	10 6		3 22	11 0	3 44	11 3	12 9	
3 25	13 4	3 41	13 8		3 45	10 9	4 3	11 0		4 4	11 6	4 23	11 9	13 9	
3 59	13 11	4 17	14 2		4 22	11 3	4 40	11 4		4 43	11 11	5 3	12 1	14 9	
4 34	14 5	4 52	14 7		4 59	11 6	5 18	11 8		5 21	12 2	5 39	12 3	○	
5 10	14 8	5 28	14 8		5 37	11 8	5 55	11 8		5 57	12 4	6 16	12 4	16 9	
5 47	14 7	6 6	14 5		6 14	11 8	6 33	11 7		6 35	12 4	6 54	12 3	17 9	
6 26	14 3	6 47	14 0		6 52	11 5	7 12	11 3		7 13	12 2	7 33	12 1	18 9	
7 9	13 9	7 33	13 5		7 33	11 1	7 55	10 10		7 53	12 0	8 14	11 10	19 9	
8 0	13 0	8 28	12 6		8 18	10 7	8 42	10 4		8 36	11 7	8 59	11 4	20 9	
8 58	12 1	9 30	11 9		9 9	10 1	9 37	9 10		9 23	11 1	9 53	10 10	21 9	
10 8	11 7	10 48	11 7		10 10	9 8	10 47	9 8		10 31	10 7	11 8	10 6	22 9	
11 28	11 9	—	—		11 25	9 8	—	—		11 44	10 5	—	—	23 9	

If Mean Spring } 7ft. 5in.  
Range.

5ft. 10in.

6ft. 2in.

Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
3 49		9	1 30		17	0 33		25	2 12	
3 31		10	1 14		18	0 47		26	2 22	
3 13		11	0 57		19	1 0		27	2 31	
2 56		12	0 42		20	1 13		28	2 41	
2 38		13	0 26		21	1 26		29	2 49	
2 21		14	0 11		22	1 38		30	2 57	
2 4		15	0 4	Add.	23	1 50				
1 47		16	0 19		24	2 1				

as of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 8 m.



## TIDE TABLES FOR THE

MAY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
		H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.																							
S.	1	8 mo	11 42	15 7	—	—	—	0 35	13 4	1 17	13 0	6 52	10 8	7 29																											
M.	2	8 51	0 15	16 1	0 45	16 8	1 55	13 11	2 32	13 10	8 4	11 4	8 36																												
Tu.	3	9 43	1 15	17 3	1 40	17 10	3 3	14 9	3 30	14 8	9 7	12 0	9 34																												
W.	4	10 35	2 5	18 5	2 30	18 11	3 57	15 3	4 23	15 3	10 0	12 5	10 26																												
Th.	5	11 28	2 53	19 3	3 15	19 6	4 48	15 7	5 12	15 8	10 49	12 9	11 11																												
F.	6	12 23	3 36	19 6	3 58	19 5	5 33	15 9	5 54	15 9	11 32	12 10	11 54																												
S.	7	1 17	4 20	19 3	4 40	19 0	6 15	15 8	6 36	15 8	—	—	0 17																												
S.	8	2 10	4 59	18 8	5 19	18 3	6 54	15 4	7 12	15 5	0 39	12 7	0 59																												
M.	9	3 2	5 37	17 10	5 57	17 5	7 30	14 9	7 47	14 10	1 19	12 3	1 39																												
Tu.	10	3 52	6 18	16 11	6 39	16 3	8 5	14 0	8 23	14 2	1 58	11 10	2 20																												
W.	11	4 39	6 59	15 8	7 22	15 1	8 40	13 2	8 58	13 5	2 40	11 4	3 0																												
Th.	12	5 24	7 45	14 6	8 9	14 1	9 18	12 5	9 40	12 8	3 21	10 10	3 43																												
F.	13	6 8	8 36	13 8	9 4	13 5	10 3	11 9	10 30	12 1	4 6	10 5	4 33																												
S.	14	6 50	9 37	13 4	10 11	13 4	10 57	11 4	11 32	11 11	5 0	10 0	5 30																												
S.	15	7 32	10 46	13 6	11 18	13 9	—	—	0 9	11 6	6 3	9 10	6 35																												
M.	16	8 15	11 50	14 1	—	—	0 45	12 2	1 20	12 1	7 7	10 0	7 38																												
Tu.	17	8 59	0 20	14 6	0 46	14 11	1 54	12 10	2 26	12 10	8 8	10 6	8 37																												
W.	18	9 45	1 12	15 5	1 35	16 0	2 53	13 6	3 20	13 7	9 3	11 0	9 27																												
Th.	19	10 34	1 56	16 6	2 16	17 0	3 43	14 0	4 6	14 3	9 50	11 7	10 11																												
F.	20	11 27	2 35	17 6	2 55	18 0	4 29	14 6	4 51	14 9	10 31	12 0	10 51																												
S.	21	morn.	3 16	18 4	3 37	18 7	5 11	14 11	5 31	15 3	11 12	12 3	11 33																												
S.	22	0 22	3 59	18 9	4 20	18 10	5 52	15 3	6 13	15 7	11 55	12 6	—																												
M.	23	1 19	4 39	18 11	4 59	18 10	6 34	15 4	6 54	15 8	0 16	12 6	0 38																												
Tu.	24	2 17	5 21	18 8	5 43	18 7	7 14	15 2	7 34	15 7	0 59	12 6	1 21																												
W.	25	3 15	6 6	18 4	6 31	18 0	7 56	14 10	8 19	15 3	1 44	12 4	2 7																												
Th.	26	4 11	6 56	17 6	7 24	17 0	8 42	14 5	9 7	14 9	2 32	12 2	2 58																												
F.	27	5 5	7 54	16 6	8 24	16 0	9 34	13 10	10 1	14 1	3 24	11 9	3 52																												
S.	28	5 57	8 55	15 8	9 26	15 5	10 29	13 2	11 1	13 7	4 21	11 4	4 51																												
S.	29	6 48	10 1	15 5	10 37	15 6	11 33	12 10	—	—	5 21	11 0	5 54																												
M.	30	7 38	11 12	15 7	11 45	15 10	0 11	13 5	0 51	13 1	6 27	10 10	7 0																												
T.	31	8 29	—	—	0 16	16 1	1 28	13 9	2 3	13 7	7 33	11 1	8 0																												
Half Mean Spring Range.			9 ft. 6 in.						7 ft. 9 in.						6 ft. 4 in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
			D. H. M.						M.D.			°			'			M.D.			°			'			M.D.			°			'								
New			— 6 0			14 Morning.			1			28. 33			9			19 N. 50			17			6 s. 23			25														
First Quarter			— 13 6			21 Afternoon.			2			2 N. 24			10			18 24			18			10 21			26														
Full			— 21 1			24 Afternoon.			3			7 13			11			16 8			19			13 57			27														
Last Quarter			— 28 9			21 Morning.			4			11 35			12			13 13			20			16 57			28														
									5			15 16			13			9 48			21			19 7			29														
In Perigee			— 1 11			0 Morning.			6			18 1			14			6 0			22			20 13			30														
In Apogee			— 13 9			0 Afternoon.			7			19 43			15			1 57			23			20 7			31														
In Perigee			— 26 0			0 Noon.			8			20 19			16			2 s. 14			24			18 44																	

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m.      DEVONPORT add 17 m.      PORTSMOUTH add 16 m.

MAY, 1864.

DOVER.						SHEERNESS.						LONDON.						C's AGE AT NOON.					
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
Time. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	D							
19 15 7	6 55 16 0	8 5 13 9	8 44 14 0	9 31 16 7	10 9 16 9	24 9																	
30 16 6	8 1 17 0	9 20 14 4	9 52 14 9	10 46 17 0	11 20 17 3	25 9																	
30 17 5	8 57 17 10	10 21 15 1	10 49 15 5	11 50 17 7	—	26 9																	
23 18 2	9 50 18 6	11 14 15 8	11 38 15 11	0 18 17 11	0 44 18 3	27 9																	
16 18 9	10 40 18 11	—	0 3 16 2	1 9 18 7	1 34 18 10	28 9																	
3 18 11	11 27 18 11	0 26 16 3	0 48 16 4	1 58 19 1	2 18 19 3	●																	
50 18 10	—	1 9 16 5	1 30 16 4	2 40 19 4	3 0 19 4	1 5																	
13 18 8	0 34 18 5	1 51 16 2	2 11 16 0	3 22 19 3	3 40 19 2	2 5																	
56 18 2	1 17 17 10	2 30 15 10	2 49 15 8	4 0 19 0	4 20 18 9	3 5																	
38 17 6	2 0 17 2	3 8 15 4	3 27 15 1	4 39 18 6	4 59 18 2	4 5																	
21 16 9	2 42 16 3	3 48 14 9	4 9 14 5	5 20 17 11	5 38 17 6	5 5																	
3 15 10	3 24 15 5	4 30 14 1	4 53 13 9	5 59 17 2	6 22 16 10	6 5																	
47 15 1	4 12 14 8	5 17 13 5	5 43 13 3	6 45 16 6	7 10 16 3	7 5																	
37 14 4	5 5 14 2	6 12 13 0	6 43 12 10	7 37 16 0	8 7 15 10	8 5																	
34 14 1	6 3 14 2	7 17 12 10	7 53 12 11	8 43 15 8	9 18 15 8	9 5																	
33 14 5	7 3 14 9	8 27 13 0	8 58 13 3	9 51 15 8	10 22 15 10	10 5																	
34 15 2	8 2 15 6	9 28 13 6	9 57 13 9	10 56 16 0	11 26 16 3	11 5																	
27 15 11	8 50 16 4	10 22 14 1	10 46 14 4	11 54 16 6	—	12 5																	
13 16 9	9 35 17 11	9 14 8	11 29 14 11	0 17 16 9	0 38 17 11	13 5																	
56 17 5	10 19 17 9	11 49 15 2	—	0 59 17 5	1 20 17 9	14 5																	
41 18 0	11 4 18 3	0 8 15 4	0 28 15 7	1 41 18 0	2 2 18 4	0																	
28 18 4	11 50 18 6	0 49 15 9	1 10 15 11	2 20 18 7	2 40 18 9	16 5																	
—	0 12 18 7	1 31 16 0	1 51 16 0	2 58 18 11	3 19 19 0	17 5																	
34 18 7	0 58 18 6	2 10 16 0	2 30 15 11	3 39 19 1	4 0 19 1	18 5																	
23 18 5	1 47 18 3	2 51 15 10	3 13 15 9	4 22 19 0	4 45 18 11	19 5																	
12 18 0	2 38 17 8	3 36 15 7	4 1 15 4	5 6 18 9	5 31 18 6	20 5																	
5 17 4	3 33 17 0	4 27 15 1	4 54 14 9	5 57 18 3	6 24 18 0	21 5																	
2 16 8	4 30 16 3	5 24 14 6	5 57 14 4	6 54 17 9	7 26 17 5	22 5																	
57 15 11	5 26 15 10	6 31 14 1	7 5 13 11	7 59 17 3	8 32 17 11	23 5																	
56 15 9	6 26 15 11	7 42 14 0	8 19 14 1	9 7 17 0	9 43 16 11	24 5																	
58 16 2	7 31 16 6	8 51 14 3	9 23 14 6	10 18 17 0	10 49 17 12	25 5																	
Mean Spring Tide.						9ft. 4in.						8ft. 0in.						9ft. 7in.					

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
3 5		9	3 45		17	3 49		25	3 19	
3 12		10	3 48		18	3 47		26	3 13	
3 18		11	3 49		19	3 45		27	3 6	
3 24		12	3 51		20	3 42		28	2 59	
3 30		13	3 52		21	3 38		29	2 51	
3 34		14	3 52		22	3 34		30	2 43	
3 38		15	3 52		23	3 30		31	2 34	
3 42		16	3 51		24	3 24				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
DOVER subtract 5 m. SHEERNESS subtract 3 m. LONDON 0 m.



MAY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.																																
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																													
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																												
			H. M.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.	H. M.	F. L.																										
M.	1	8m 0	7	13	10	2	7	52	10	4	1	42	17	4	2	17	17	8	11	10	11	11	42	12																							
M.	2	8 51	8	27	10	6	8	59	10	9	2	49	18	2	3	20	18	10	—	—	0	11	12	12																							
Tu.	3	9 43	9	28	11	0	9	57	11	3	3	49	19	4	4	18	19	10	0	39	13	0	1	8	13																						
W.	4	10 35	10	25	11	5	10	50	11	7	4	43	20	3	5	6	20	8	1	35	13	9	2	1	14																						
Th.	5	11 28	11	15	11	9	11	39	11	10	5	31	20	11	5	55	21	1	2	27	14	3	2	5	14																						
F.	6	0a 23	—	—	—	—	0	11	11	10	6	18	21	2	6	40	21	3	3	12	14	6	3	3	14																						
S.	7	1 17	0	22	11	10	0	43	11	9	7	22	21	2	7	24	21	0	3	53	14	7	4	14	14																						
M.	8	2 10	1	5	11	8	1	26	11	6	7	45	20	10	8	3	20	7	4	34	14	5	4	53	14																						
M.	9	3 2	1	45	11	4	2	5	11	2	8	23	20	3	8	43	19	9	5	13	13	10	5	33	13																						
Tu.	10	3 52	2	25	10	11	2	45	10	9	9	2	19	4	9	25	18	10	5	53	13	1	6	15	12																						
W.	11	4 39	3	7	10	7	3	27	10	4	9	45	18	3	10	5	17	10	6	38	12	4	7	1	12																						
Th.	12	5 24	3	47	10	2	4	8	10	0	10	29	17	4	10	55	16	11	7	25	11	9	7	49	11																						
F.	13	6 8	4	30	9	10	4	55	9	8	11	24	16	7	11	56	16	3	8	15	11	2	8	44	11																						
S.	14	6 50	5	22	9	7	5	50	9	6	—	—	—	—	0	28	16	0	9	14	10	10	9	48	10																						
M.	15	7 32	6	23	9	6	7	0	9	7	1	0	15	11	1	31	15	11	10	22	10	9	10	53	10																						
M.	16	8 15	7	35	9	8	8	6	9	10	2	1	16	1	2	29	16	5	11	23	11	0	11	50	11																						
Tu.	17	8 59	8	35	9	11	9	3	10	2	2	57	16	11	3	25	17	5	—	—	—	0	16	11	11																						
W.	18	9 45	9	29	10	4	9	55	10	6	3	51	17	10	4	15	18	3	0	41	11	11	1	5	12																						
Th.	19	10 34	10	19	10	9	10	40	10	11	4	38	18	9	4	57	19	1	1	28	12	7	1	51	12																						
F.	20	11 27	11	0	11	1	11	21	11	3	5	17	19	5	5	36	19	9	2	12	13	1	2	33	13																						
S.	21	morn.	11	41	11	4	—	—	—	—	5	57	20	0	6	19	20	3	2	53	13	7	3	13	13																						
M.	22	0 22	0	2	11	5	0	23	11	6	6	41	20	5	7	32	20	7	3	33	14	0	3	54	14																						
M.	23	1 19	0	44	11	6	1	4	11	6	7	23	20	8	7	44	20	8	4	14	14	3	4	33	14																						
Tu.	24	2 17	1	24	11	5	1	44	11	4	8	3	20	8	8	25	20	7	4	53	14	3	5	15	14																						
W.	25	3 15	2	7	11	3	2	31	11	2	8	48	20	5	9	12	20	1	5	39	13	11	6	3	13																						
Th.	26	4 11	2	55	11	1	3	19	11	0	9	37	19	9	10	2	19	4	6	29	13	5	6	57	13																						
F.	27	5 5	3	44	10	10	4	10	10	8	10	30	19	0	11	2	18	7	7	26	12	11	7	56	12																						
S.	28	5 57	4	38	10	6	5	10	10	5	11	38	18	3	—	—	—	—	8	29	12	5	9	2	12																						
M.	29	6 48	5	41	10	4	6	13	10	4	0	16	18	0	0	50	17	9	9	36	12	1	10	13	12																						
M.	30	7 38	6	49	10	4	7	27	10	5	1	23	17	9	1	54	17	10	10	46	12	1	11	16	12																						
Tu.	31	8 29	7	59	10	6	8	30	10	7	2	23	18	1	2	52	18	5	11	45	12	5	—	—	—																						
Half Mean Spring } Range.			5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.																																
Phases of the Moon,																								Moon's Declination at Noon.																							
D. H. M.																								M. D. ° ' M. D. ° ' M. D. ° ' M. D. ° '																							
New - - - 6 0 14 Morning.																								1 28.33 9 19 N.50 17 6s.23 25 16s.17																							
First Quarter - 13 6 21 Afternoon.																								2 2 N.24 10 18 24 18 10 21 26 12 41																							
Full - - - 21 1 24 Afternoon.																								3 7 13 11 16 8 19 13 57 27 8 2																							
Last Quarter - 28 9 21 Morning.																								4 11 35 12 13 13 20 16 57 28 3 4																							
																								5 15 16 13 9 48 21 19 7 29 1N.1																							
In Perigee - 1 11 0 Morning.																								6 18 1 14 6 0 22 20 13 30 5 5																							
In Apogee - 13 9 0 Afternoon.																								7 19 43 15 1 57 23 20 7 31 10 2																							
In Perigee - 26 0 0 Noon.																								8 20 19 16 28.14 24 18 44																							

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,  
**HARWICH** subtract 5 m.      **HULL** add 1 m.      **SUNDERLAND** add 5 m.

MAY, 1864.

NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. P. I.	Height.		Time. H. M. P. I.	Height.		Time. H. M. P. I.	Height.		Time. H. M. P. I.	Height.		Time. H. M. P. I.	Height.		Time. H. M. P. I.	Height.		
11 22 10 11	11	11	11 56 11 3	11	3	10 16 13 7	10	49	13 11	4 15 10 5	4 50 10 7	24.9						
— — — —	—	—	0 25 11 7	11	7	11 18 14 3	11	46 14 8	5 20 10 11	5 47 11 4	25.9							
0 52 11 11	11	11	1 18 12 2	—	—	— — — —	0 12 15 0	6 13 11 9	6 35 12 3	26.9								
1 42 12 6	6	2	2 6 12 10	0	36 15 5	1 1 15 10	6 57 12 8	7 18 13 1	27.9									
2 30 13 1	1	2	2 51 13 3	1	26 16 2	1 49 16 5	7 38 13 5	7 59 13 7	28.9									
3 12 13 5	5	3	3 33 13 6	2	10 16 7	2 31 16 8	8 19 13 8	8 39 13 6	●									
3 54 13 5	5	4	4 15 13 4	2	51 16 7	3 11 16 5	9 0 13 4	9 21 13 2	1.5									
4 36 13 2	2	4	4 56 12 10	3	31 16 2	3 50 15 10	9 40 12 10	10 1 12 6	2.5									
5 17 12 6	6	5	5 37 12 3	4	11 15 6	4 32 15 3	10 22 12 2	10 43 11 9	3.5									
5 57 12 0	4	6	6 19 11 8	4	52 14 11	5 14 14 7	11 6 11 5	11 28 11 0	4.5									
6 41 11 4	0	7	7 2 11 0	5	36 14 2	5 59 13 9	11 51 10 7	— — — —	5.5									
7 27 10 8	8	7	7 53 10 3	6	23 13 5	6 48 13 0	0 16 10 3	0 41 9 11	6.5									
8 21 9 11	11	8	8 52 9 9	7	16 12 9	7 47 12 6	1 7 9 8	1 37 9 5	7.5									
9 25 9 8	8	10	1 1 9 7	8	18 12 4	8 53 12 3	2 9 9 3	2 45 9 2	8.5									
10 34 9 8	8	11	5 9 10	9	28 12 4	10 0 12 5	3 23 9 2	3 58 9 3	9.5									
11 36 10 1	—	—	— — — —	10	29 12 7	10 56 12 10	4 29 9 5	4 58 9 7	10.5									
0 3 10 4	4	0	30 10 7	11	23 13 2	11 48 13 5	5 25 9 9	5 50 10 11	11.5									
0 54 10 10	10	1	16 11 1	—	—	0 10 13 9	6 12 10 6	6 32 10 11	12.5									
1 37 11 4	4	1	57 11 7	0	31 14 2	0 51 14 6	6 50 11 4	7 7 11 9	13.5									
2 16 11 11	11	2	35 12 3	1	11 14 11	1 31 15 3	7 23 12 2	7 41 12 6	14.5									
2 54 12 6	6	3	13 12 9	1	51 15 7	2 11 15 10	8 0 12 10	8 20 13 0	○									
3 34 12 11	11	3	55 13 0	2	32 16 0	2 52 16 1	8 40 13 1	9 0 13 1	16.5									
4 15 13 1	1	4	35 13 1	3	11 16 2	3 31 16 1	9 20 13 1	9 40 13 0	17.5									
4 56 12 11	11	5	19 12 9	3	51 16 0	4 13 15 10	10 3 12 10	10 27 12 8	18.5									
5 43 12 8	6	6	7 12 6	4	37 15 8	5 1 15 6	10 52 12 5	11 19 12 1	19.5									
6 32 12 4	4	6	59 12 1	5	27 15 4	5 55 15 0	11 47 11 10	— — — —	20.5									
7 28 11 10	10	8	0 11 6	6	25 14 8	6 55 14 4	0 16 11 6	0 47 11 3	21.5									
8 35 11 2	2	9	11 11 0	7	30 14 1	8 5 13 10	1 21 11 0	1 56 10 9	22.5									
9 47 10 11	11	10	25 11 0	8	41 13 9	9 18 13 8	2 31 10 8	3 12 10 7	23.5									
10 58 11 1	1	11	29 11 3	9	53 13 9	10 23 13 11	3 50 10 7	4 22 10 8	24.5									
11 59 11 5	—	—	— — — —	10	52 14 1	11 20 14 3	4 53 10 9	5 22 10 11	25.5									
Mean Spring } Range.						8ft. 2in.						6ft. 7in.						

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
3 5		9	3 45		17	3 49		25	3 19	
3 12		10	3 48		18	3 47		26	3 13	
3 18		11	3 49		19	3 45		27	3 6	
3 24		12	3 51		20	3 42		28	2 59	
3 30		13	3 52		21	3 38		29	2 51	
3 34		14	3 52		22	3 34		30	2 43	
3 38		15	3 52		23	3 30		31	2 34	
3 42		16	3 51		24	3 24				

as of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
 NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.

JUNE, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
			H. M.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	
W.	1	20	0 48	16 5		1 20	16 9		2 35	14 1		3 7	14 2		8 40	11 6		9 12		
Th.	2	10	1 47	17 2		2 11	17 7		3 35	14 5		4 3	14 7		9 41	11 11		10 6		
F.	3	11	2 34	17 11		2 59	18 2		4 27	14 10		4 51	15 0		10 30	12 2		10 55		
S.	4	12	3 22	18 3		3 43	18 3		5 15	15 0		5 36	15 4		11 18	12 3		11 38		
S.	5	08	4 4	18 2		4 25	18 1		5 57	15 0		6 17	15 5		12 0	12 3		—		
M.	6	1	4 43	18 0		5 17	17 9		6 37	14 11		6 55	15 3		0 21	12 2		0 41		
Tu.	7	2	5 20	17 6		5 38	17 3		7 12	14 6		7 28	14 11		1 11	11 11		1 20		
W.	8	3	5 57	17 0		6 15	16 9		7 44	14 1		8 14	15 1		1 39	11 9		1 57		
Th.	9	4	6 34	16 4		6 53	16 0		8 18	13 5		8 34	13 9		2 15	11 6		2 35		
F.	10	4	7 15	15 6		7 38	15 1		8 50	12 10		9 8	13 1		2 55	11 2		3 16		
S.	11	5	7 59	14 8		8 21	14 4		9 28	12 3		9 48	12 6		3 37	10 10		3 57		
S.	12	6	8 44	14 1		9 10	13 10		10 12	11 10		10 36	12 1		4 18	10 6		4 41		
M.	13	6	9 40	13 9		10 11	13 10		11 4	11 7		11 35	12 0		5 6	10 2		5 33		
Tu.	14	7	10 44	13 10		11 18	14 0		—	—		0 10	11 11		6 3	10 0		6 33		
W.	15	8	11 52	14 4		—	—		0 46	12 3		1 22	12 4		7 6	10 2		7 39		
Th.	16	9	0 23	14 9		0 51	15 2		1 57	12 8		2 32	13 0		8 12	10 7		8 42		
F.	17	10	1 18	15 8		1 43	16 3		3 1	13 4		3 30	13 9		9 10	11 2		9 36		
S.	18	11	2 7	16 11		2 31	17 6		3 57	14 0		4 22	14 7		10 2	11 9		10 27		
S.	19	morn.	2 54	18 1		3 17	18 6		4 47	14 8		5 11	15 3		10 50	12 2		11 13		
M.	20	0	3 40	18 10		4 3	19 1		5 34	15 2		5 57	16 2		11 36	12 6		11 59		
Tu.	21	1	4 26	19 3		4 49	19 7		6 20	15 8		6 44	16 2		—	—		0 23		
W.	22	2	5 11	19 5		5 33	19 4		7 6	15 7		7 28	16 2		0 48	12 9		1 11		
Th.	23	2	5 57	19 3		6 21	19 0		7 51	15 5		8 15	15 11		1 35	12 9		1 59		
F.	24	3	6 47	18 7		7 13	18 1		8 39	15 0		9 1	15 5		2 23	12 8		2 49		
S.	25	4	7 40	17 7		8 7	16 11		9 23	14 5		9 47	14 8		3 14	12 3		3 40		
S.	26	5	8 34	16 4		9 2	15 10		10 13	13 9		10 39	13 10		4 5	11 10		4 31		
M.	27	6	9 31	15 6		10 3	15 3		11 7	13 3		11 37	13 3		4 58	11 3		5 25		
Tu.	28	7	10 38	14 11		11 14	15 0		—	—		0 11	12 11		5 56	10 9		6 28		
W.	29	8	11 53	15 1		—	—		0 48	13 0		1 26	13 0		7 3	10 8		7 40		
Th.	30	9	0 26	15 3		0 59	15 7		2 4	13 1		2 39	13 4		8 15	10 11		8 50		
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.					
Phases of the Moon.										Moon's Declination at Noon.										
D. H. M.										M.D. ° ' "										
New - - - -	4	11	40	Morning.						1	14	N. 13	9	11	N. 3	17	18	S. 22	25	
First Quarter -	12	11	48	Morning.						2	17	14	10	7	22	18	19	56	26	
Full - - - -	19	10	54	Afternoon.						3	19	16	11	3	24	19	20	19	27	
Last Quarter -	26	2	15	Afternoon.						4	20	15	12	0	S. 43	20	19	24	28	
										5	20	9	13	4	51	21	17	13	29	
In Apogee - -	10	3	0	Afternoon.						6	19	3	14	8	52	22	13	54	30	
In Perigee - -	22	1	0	Afternoon.						7	17	3	15	12	35	23	9	44		
										8	14	20	16	15	50	24	5	1		

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m.      DEVONPORT add 17 m.      PORTSMOUTH add 4

MAY, 1864.

TON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's AGE AT NOON.
ING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	
0	11	2 16	31 6	5 50	13 8	6 23	14 0	6 37	9 5	7 10	9 8	24.9
2	4	3 26	33 3	6 52	14 4	7 20	14 8	7 40	9 11	8 10	10 1	25.9
4	2	4 33	35 1	7 47	15 1	8 12	15 5	8 40	10 4	9 8	10 6	26.9
5	0	5 31	36 8	8 36	15 8	8 59	15 11	9 34	10 8	9 59	10 10	27.9
7	3	6 23	37 6	9 22	16 1	9 43	16 3	10 20	11 0	10 41	11 1	28.9
7	7	7 8	37 7	10 4	16 3	10 24	16 2	11 11	11 2	11 22	11 1	29.9
7	6	7 50	37 2	10 43	16 1	11 2	15 11	11 43	11 0	—	—	1.5
6	9	8 28	36 2	11 21	15 9	11 42	15 5	0 4	10 10	0 24	10 9	2.5
5	7	9 5	34 11	—	—	0 3	15 1	0 45	10 7	1 6	10 3	3.5
4	1	9 41	33 2	0 24	14 9	0 47	14 5	1 26	10 1	1 48	9 11	4.5
2	2	10 15	31 5	1 10	14 0	1 32	13 8	2 10	9 8	2 32	9 6	5.5
10	6	10 54	29 9	1 56	13 4	2 21	13 0	2 56	9 4	3 20	9 2	6.5
19	0	11 45	28 6	2 48	12 9	3 18	12 6	3 46	9 0	4 17	8 10	7.5
—	—	0 16	28 1	3 50	12 4	4 26	12 3	4 48	8 9	5 20	8 8	8.5
28	0	1 21	28 2	5 1	12 4	5 33	12 6	5 52	8 8	6 21	8 9	9.5
28	6	2 25	29 0	6 3	12 9	6 30	12 11	6 50	8 11	7 18	9 1	10.5
29	8	3 27	30 5	6 57	13 2	7 22	13 6	7 45	9 3	8 11	9 6	11.5
31	2	4 24	32 1	7 45	13 10	8 7	14 2	8 37	9 8	9 1	9 10	12.5
32	11	5 15	33 9	8 27	14 5	8 46	14 9	9 24	10 0	9 45	10 2	13.5
334	6	6 1	35 2	9 5	15 0	9 24	15 3	10 4	10 4	10 23	10 6	14.5
435	8	6 46	36 2	9 44	15 6	10 5	15 8	10 42	10 8	11 2	10 9	15.5
836	7	7 29	36 11	10 25	15 9	10 43	15 10	11 23	10 10	11 43	10 10	16.5
937	0	8 9	37 0	11 1	15 10	11 20	15 9	—	—	0 4	10 10	17.5
1036	10	8 51	36 8	11 44	15 8	—	—	0 24	10 9	0 47	10 8	18.5
1336	4	9 35	35 10	0 9	15 7	0 34	15 4	1 11	10 7	1 36	10 5	19.5
5735	2	10 19	34 5	1 1	15 1	1 29	14 10	2 1	10 4	2 29	10 2	20.5
4233	8	11 9	32 11	1 58	14 7	2 28	14 3	2 57	10 3	3 27	9 10	21.5
3732	2	—	—	3 2	14 0	3 37	13 10	4 0	9 9	4 36	9 7	22.5
631	8	0 39	31 5	4 12	13 9	4 51	13 9	5 10	9 6	5 43	9 5	23.5
1331	5	1 46	31 7	5 26	13 10	5 56	14 0	6 14	9 6	6 44	9 8	24.5
2031	10	2 54	32 4	6 26	14 2	6 54	14 4	7 13	9 9	7 42	9 11	25.5
Spring }		18 ft. 7 in.		8 ft. 0 in.		5 ft. 6 in.						

## Equation of Time at Noon.

S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
5		9	3 45		17	3 49		25	3 19	
12		10	3 48		18	3 47		26	3 13	
18		11	3 49		19	3 45		27	3 6	
24		12	3 51		20	3 42		28	2 59	
30		13	3 52		21	3 38		29	2 51	
34		14	3 52		22	3 34		30	2 43	
38		15	3 52		23	3 30		31	2 34	
42		16	3 51		24	3 24				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 T-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

MAY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.														
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.											
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.										
		H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.										
Sp.	1	8m 0	6 20	8 4	6 55	8 5	3 54	6 6	4 23	6 9	0 54	9 1	1 28																
M.	2	8 51	7 26	8 7	7 54	8 9	4 47	6 11	5 9	7 1	1 59	9 7	2 26																
Tu.	3	9 43	8 21	8 11	8 46	9 2	5 32	7 3	5 56	7 5	2 52	10 2	3 15																
W.	4	10 35	9 10	9 4	9 35	9 5	6 20	7 7	6 45	7 8	3 38	10 9	4 1																
Th.	5	11 28	9 58	9 6	10 19	9 7	7 10	7 9	7 33	7 10	4 24	11 3	4 46																
F.	6	0a 23	10 40	9 7	11 1	9 7	7 54	7 10	8 14	7 10	5 8	11 5	5 30																
S.	7	1 17	11 21	9 6	11 40	9 5	8 34	7 9	8 52	7 7	5 51	11 4	6 10																
Sp.	8	2 10	11 59	9 4	—	—	9 10	7 5	9 29	7 3	6 29	10 11	6 50																
M.	9	3 2	0 20	9 3	0 42	9 2	9 48	7 0	10 6	6 10	7 10	10 4	7 30																
Tu.	10	3 52	1 3	9 0	1 27	8 11	10 27	6 7	10 48	6 4	7 51	9 8	8 11																
W.	11	4 39	1 50	8 9	2 13	8 7	11 13	6 2	11 43	5 11	8 33	9 0	8 59																
Th.	12	5 24	2 38	8 5	3 3	8 3	—	—	0 14	5 8	9 26	8 6	9 55																
F.	13	6 1	3 30	8 2	3 59	8 1	0 47	5 6	1 24	5 5	10 27	8 2	11 0																
S.	14	6 50	4 29	8 0	5 1	8 0	2 2	5 5	2 38	5 5	11 34	8 1	—																
Sp.	15	7 32	5 33	7 11	6 3	7 11	3 11	5 7	3 40	5 10	0 6	8 2	0 37																
M.	16	8 15	6 34	8 0	7 3	8 1	4 6	6 0	4 29	6 2	1 8	8 4	1 36																
Tu.	17	8 59	7 31	8 2	7 56	8 3	4 52	6 4	5 12	6 6	2 4	8 9	2 29																
W.	18	9 45	8 19	8 5	8 40	8 8	5 31	6 7	5 51	6 9	2 50	9 3	3 11																
Th.	19	10 34	9 1	8 10	9 21	9 0	6 11	6 11	6 31	7 1	3 30	9 10	3 48																
F.	20	11 27	9 40	9 1	10 0	9 2	6 52	7 2	7 13	7 4	4 6	10 4	4 26																
S.	21	morn.	10 20	9 3	10 41	9 4	7 34	7 5	7 55	7 6	4 47	10 10	5 9																
Sp.	22	0 22	11 1	9 5	11 21	9 5	8 15	7 7	8 34	7 8	5 31	11 1	5 51																
M.	23	1 19	11 39	9 4	11 59	9 4	8 51	7 7	9 10	7 6	6 9	11 1	6 25																
Tu.	24	2 17	—	—	0 23	9 4	9 31	7 5	9 53	7 3	6 52	10 10	7 16																
W.	25	3 15	0 48	9 4	1 13	9 3	10 16	7 2	10 40	7 0	7 39	10 5	8 3																
Th.	26	4 11	1 40	9 2	2 10	9 0	11 8	6 10	11 42	6 7	8 30	9 11	8 55																
F.	27	5 5	2 40	8 11	3 11	8 9	—	—	0 20	6 4	9 33	9 6	10 5																
S.	28	5 57	3 44	8 8	4 18	8 7	1 1	6 3	1 44	6 2	10 47	9 2	11 21																
Sp.	29	6 48	4 52	8 6	5 25	8 6	2 24	6 2	3 2	6 3	11 58	9 2	—																
M.	30	7 38	5 56	8 5	6 27	8 5	3 33	6 6	4 0	6 8	0 30	9 3	1																
Tu.	31	8 29	6 58	8 6	7 28	8 7	4 25	6 10	4 48	6 11	1 31	9 5	2																
Half Mean Spring } Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.														
Phases of the Moon.															Moon's Declination at Noon.														
D. H. M.															M.D. ° ' "														
New - - - - 6 0 14 Morning.															1 28.33 9 19N.50 17 68.23 25														
First Quarter- 13 6 21 Afternoon.															2 2 N.24 10 18 24 18 10 21 26														
Full - - - - 21 1 24 Afternoon.															3 7 13 11 16 8 19 13 57 27														
Last Quarter - 28 9 21 Morning.															4 11 35 12 13 13 20 16 57 28														
															5 15 16 13 9 48 21 19 7 29														
In Perigee - - 1 11 0 Morning.															6 18 1 14 6 0 22 20 13 30														
In Apogee - - 13 9 0 Afternoon.															7 19 43 15 1 57 23 20 7 31														
In Perigee - - 26 0 0 Noon.															8 20 19 16 2 14 24 18 44														

The times for High Water are given for Mean Time at Place; if Dublin or Railway Time be required

BELFAST subtract 2 m.

LONDONDERRY add 4 m.

SLIGO BAY add 1

MAY, 1864.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		
0 6 12 0	0 40 12 4		0 4 9 9	0 40 10 0		0 18 10 6	0 51 10 9		24 9			0 10 12 9	0 51 10 9		24 9			
1 10 12 9	1 37 13 2		1 15 10 3	1 48 10 6		1 24 11 0	1 57 11 3		25 9			1 10 12 9	1 57 11 3		25 9			
2 4 13 6	2 30 13 11		2 19 10 10	2 47 11 1		2 31 11 7	3 2 11 10		26 9			2 10 12 9	3 2 11 7		26 9			
2 56 14 3	3 21 14 6		3 14 11 4	3 41 11 7		3 32 12 1	4 0 12 4		27 9			3 10 12 9	4 0 12 1		27 9			
3 44 14 9	4 6 15 0		4 7 11 9	4 29 11 10		4 28 12 6	4 52 12 6		28 9			4 10 12 9	4 52 12 6		28 9			
4 27 15 0	4 48 15 0		4 51 11 11	5 14 11 11		5 14 12 6	5 35 12 6		29 9			5 10 12 9	5 35 12 6		29 9			
5 10 14 11	5 31 14 9		5 37 11 10	5 58 11 9		5 57 12 6	6 18 12 5		1 5			6 10 12 9	6 18 12 5		1 5			
5 51 14 6	6 11 14 2		6 17 11 7	6 37 11 5		6 38 12 3	6 59 12 2		2 5			7 10 12 9	6 59 12 3		2 5			
6 31 13 10	6 51 13 6		6 57 11 2	7 17 10 11		7 18 12 0	7 37 11 9		3 5			8 10 12 9	7 37 11 9		3 5			
7 13 13 1	7 35 12 8		7 38 10 7	7 57 10 4		7 57 11 7	8 15 11 4		4 5			9 10 12 9	8 15 11 7		4 5			
7 57 12 3	8 21 11 9		8 15 10 1	8 35 9 10		8 34 11 1	8 52 10 10		5 5			10 10 12 9	8 52 10 11		5 5			
8 45 11 4	9 10 11 0		8 57 9 7	9 19 9 4		9 11 10 7	9 33 10 4		6 5			11 10 12 9	9 33 10 7		6 5			
9 38 10 9	10 8 10 6		9 43 9 2	10 9 9 0		10 1 10 2	10 31 9 11		7 5			12 10 12 9	10 31 9 11		7 5			
10 42 10 6	11 16 10 7		10 41 8 11	11 14 8 11		11 2 9 9	11 33 9 8		8 5			1 10 12 9	11 33 9 8		8 5			
11 49 10 8	—		11 47 8 11	—		—	0 2 9 8		9 5			2 10 12 9	0 2 9 8		9 5			
0 20 10 11	0 48 11 2		0 18 9 1	0 49 9 3		0 31 9 10	0 59 10 0		10 5			3 10 12 9	0 59 10 0		10 5			
1 15 11 6	1 40 11 10		1 20 9 5	1 49 9 8		1 28 10 2	1 58 10 5		11 5			4 10 12 9	1 58 10 2		11 5			
2 3 12 2	2 25 12 7		2 16 9 11	2 40 10 2		2 27 10 8	2 54 10 11		12 5			5 10 12 9	2 54 10 8		12 5			
2 46 12 10	3 7 13 2		3 4 10 5	3 26 10 8		3 19 11 2	3 43 11 5		13 5			6 10 12 9	3 43 11 2		13 5			
3 26 13 6	3 46 13 10		3 47 10 11	4 9 11 1		4 7 11 8	4 31 11 10		14 5			7 10 12 9	4 31 11 8		14 5			
4 7 14 1	4 28 14 4		4 30 11 3	4 52 11 5		4 53 12 0	5 15 12 1		15 5			8 10 12 9	5 15 12 0		15 5			
4 49 14 6	5 9 14 8		5 14 11 7	5 36 11 8		5 36 12 2	5 56 12 4		16 5			9 10 12 9	5 36 12 2		16 5			
5 29 14 8	5 50 14 8		5 57 11 8	6 17 11 8		6 17 12 4	6 38 12 4		17 5			10 10 12 9	6 17 12 4		17 5			
6 13 14 6	6 37 14 4		6 39 11 7	7 2 11 6		7 1 12 4	7 24 12 4		18 5			11 10 12 9	7 1 12 4		18 5			
7 1 14 2	7 26 13 11		7 25 11 4	7 49 11 2		7 46 12 3	8 9 12 1		19 5			12 10 12 9	7 46 12 3		19 5			
7 53 13 7	8 22 13 2		8 14 11 0	8 39 10 9		8 32 11 11	8 56 11 9		20 5			1 10 12 9	8 32 11 11		20 5			
8 52 12 9	9 24 12 5		9 5 10 6	9 34 10 4		9 20 11 6	9 48 11 4		21 5			2 10 12 9	9 20 11 6		21 5			
9 57 12 2	10 31 12 0		10 2 10 2	10 30 10 0		10 20 11 1	10 52 10 10		22 5			3 10 12 9	10 20 11 1		22 5			
11 6 12 1	11 42 12 2		11 5 9 11	11 39 9 11		11 25 10 9	11 55 10 8		23 5			4 10 12 9	11 25 10 9		23 5			
—	0 14 12 3		—	0 12 10 0		—	0 24 10 9		24 5			5 10 12 9	—		24 5			
0 43 12 6	1 12 12 9		0 44 10 2	1 18 10 3		0 54 10 10	1 26 11 0		25 5			6 10 12 9	0 54 10 10		25 5			
Mean Spring } 7ft. 5in. Range.						5ft. 10in.						6ft. 2in.						

Equation of Time at Noon.

M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
3 5	Add.	9	3 45	Add.	17	3 49	Add.	25	3 19	Add.
3 12		10	3 48		18	3 47		26	3 13	
3 18		11	3 49		19	3 45		27	3 6	
3 24		12	3 51		20	3 42		28	2 59	
3 30		13	3 52		21	3 38		29	2 51	
3 34		14	3 52		22	3 34		30	2 43	
3 38		15	3 52		23	3 30		31	2 34	
3 42		16	3 51		24	3 24				

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.



## TIDE TABLES FOR THE

JUNE, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.								DEVONPORT.								PORTSMOUTH.																																		
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																														
			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.																													
H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.																													
W.	1	9m20	0 48	16 5	1 20	16 9	2 35	14 1	3 7	14 2	8 40	11 6	9 12	11 11																																							
Th.	2	10 13	1 47	17 2	2 11	17 7	3 35	14 5	4 3	14 7	9 41	11 11	10 6	12 11																																							
F.	3	11 6	2 34	17 11	2 59	18 2	4 27	14 10	4 51	15 0	10 30	12 2	10 55	12 11																																							
S.	4	12 0	3 22	18 3	3 43	18 3	5 15	15 0	5 36	15 4	11 18	12 3	11 38	12 11																																							
S.	5	0a52	4 4	18 2	4 25	18 1	5 57	15 0	6 17	15 5	12 0	12 3	—	—																																							
M.	6	1 43	4 43	18 0	5 1	17 9	6 37	14 11	6 55	15 3	0 21	12 2	0 41	12 11																																							
Tu.	7	2 32	5 20	17 6	5 38	17 3	7 12	14 6	7 28	14 11	1 1	11 11	1 20	11 11																																							
W.	8	3 18	5 57	17 0	6 15	16 9	7 44	14 1	8 1	14 5	1 39	11 9	1 57	11 11																																							
Th.	9	4 3	6 34	16 4	6 53	16 0	8 18	13 5	8 34	13 9	2 15	11 6	2 35	11 11																																							
F.	10	4 45	7 15	15 6	7 38	15 1	8 50	12 10	9 8	13 1	2 55	11 2	3 16	11 11																																							
S.	11	5 27	7 59	14 8	8 21	14 4	9 28	12 3	9 48	12 6	3 37	10 10	3 57	10 11																																							
S.	12	6 9	8 44	14 1	9 10	13 10	10 12	11 10	10 36	12 1	4 18	10 6	4 41	10 11																																							
M.	13	6 52	9 40	13 9	10 11	13 10	11 4	11 7	11 35	12 0	5 6	10 2	5 33	10 11																																							
Tu.	14	7 37	10 44	13 10	11 18	14 0	—	—	0 10	11 11	6 3	10 0	6 33	10 11																																							
W.	15	8 24	11 52	14 4	—	—	0 46	12 3	1 22	12 4	7 6	10 2	7 39	10 11																																							
Th.	16	9 14	0 23	14 9	0 51	15 2	1 57	12 8	2 32	13 0	8 12	10 7	8 42	10 11																																							
F.	17	10 8	1 18	15 8	1 43	16 3	3 1	13 4	3 30	13 9	9 10	11 2	9 36	11 11																																							
S.	18	11 5	2 7	16 11	2 31	17 6	3 57	14 0	4 22	14 7	10 2	11 9	10 27	11 11																																							
S.	19	morn.	2 54	18 1	3 17	18 6	4 47	14 8	5 11	15 3	10 50	12 2	11 13	12 11																																							
M.	20	0 4	3 40	18 10	4 3	19 1	5 34	15 2	5 57	16 2	11 36	12 6	11 59	12 11																																							
Tu.	21	1 3	4 26	19 3	4 49	19 7	6 20	15 8	6 44	16 2	—	—	0 23	12 11																																							
W.	22	2 2	5 11	19 5	5 33	19 4	7 6	15 7	7 28	16 2	0 48	12 9	1 11	12 11																																							
Th.	23	2 58	5 57	19 3	6 21	19 0	7 51	15 5	8 15	15 11	1 35	12 9	1 59	12 11																																							
F.	24	3 52	6 47	18 7	7 13	18 1	8 39	15 0	9 1	15 5	2 23	12 8	2 49	12 11																																							
S.	25	4 45	7 40	17 7	8 7	16 11	9 23	14 5	9 47	14 8	3 14	12 3	3 40	12 11																																							
S.	26	5 36	8 34	16 4	9 2	15 10	10 13	13 9	10 39	13 10	4 5	11 10	4 31	11 11																																							
M.	27	6 26	9 31	15 6	10 3	15 3	11 7	13 3	11 37	13 3	4 58	11 3	5 25	11 11																																							
Tu.	28	7 17	10 38	14 11	11 14	15 0	—	—	0 11	12 11	5 56	10 9	6 28	10 11																																							
W.	29	8 9	11 53	15 1	—	—	0 48	13 0	1 26	13 0	7 3	10 8	7 40	10 11																																							
Th.	30	9 1	0 26	15 3	0 59	15 7	2 4	13 1	2 39	13 4	8 15	10 11	8 50	11 11																																							
Half Mean Spring Range.			9ft. 6in.								7ft. 9in.								6ft. 4in.																																		
Phases of the Moon.																											Moon's Declination at Noon.																										
D. H. M.																											M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°																
New - - - - -	4	11	40	Morning.	1	14	N. 13	9	11	N. 3	17	18	S. 22	25	0																																						
First Quarter -	12	11	48	Morning.	2	17	14	10	7	22	18	19	56	26	4																																						
Full - - - - -	19	10	54	Afternoon.	3	19	16	11	3	24	19	20	19	27	9																																						
Last Quarter -	26	2	15	Afternoon.	4	20	15	12	0	S. 43	20	19	24	28	13																																						
					5	20	9	13	4	51	21	17	13	29	16																																						
In Apogee - -	10	3	0	Afternoon.	6	19	3	14	8	52	22	13	54	30	18																																						
In Perigee - -	22	1	0	Afternoon.	7	17	3	15	12	35	23	9	44																																								
					8	14	20	16	15	50	24	5	1																																								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
**BREST add 18 m.**      **DEVONPORT add 17 m.**      **PORTSMOUTH add 4 m.**

JUNE, 1864.

DOVER.					SHEERNESS.					LONDON.					C <sup>o</sup> AGE At Noon.	
WINDING.	AFTERNOON.				MORNING.		AFTERNOON.			MORNING.		AFTERNOON.				
	Time.		Height.	F. I.	Time.	Height.	Time.	Height.	F. I.	Time.	Height.	F. I.	Time.	Height.		
	H. M.	F. I.														H. M.
6 9	8	35	17	0	9 54	14	9	10 25	14	11	11 20	17	3	11 52	17	526° 5
7 3	9	30	17	6	10 54	15	1	11 20	15	3	—	—	—	0 20	17	727° 5
7 9	10	22	17	11	11 43	15	5	—	—	—	0 48	17	10	1 14	18	128° 5
11 11	11	9	17	11	0 7	15	7	0 32	15	8	1 38	18	3	2 1	18	5 ●
11 11	11	55	17	10	0 55	15	9	1 16	15	9	2 25	18	6	2 46	18	7 1° 0
—	0	15	17	10	1 36	15	8	1 56	15	6	3 4	18	7	3 25	18	7 2° 0
8 0	0	57	17	6	2 14	15	5	2 32	15	4	3 44	18	6	4 2	18	5 3° 0
4 4	1	37	17	2	2 50	15	2	3 8	15	0	4 21	18	3	4 38	18	1 4° 0
0 0	2	15	16	9	3 26	14	10	3 44	14	8	4 58	17	11	5 16	17	9 5° 0
5 6	2	57	16	2	4 4	14	5	4 24	14	2	5 36	17	7	5 54	17	3 6° 0
5 10	3	38	15	7	4 46	13	11	5 8	13	9	6 16	17	1	6 38	16	10 7° 0
5 3	4	20	15	0	5 30	13	7	5 54	13	5	6 59	16	8	7 22	16	5 8° 0
4 8	5	8	14	6	6 20	13	3	6 49	13	1	7 47	16	3	8 17	16	1 9° 0
4 6	6	2	14	5	7 20	13	1	7 52	13	1	8 49	16	0	9 21	15	11 10° 0
4 8	7	5	15	0	8 25	13	2	8 58	13	5	9 51	15	11	10 22	16	0 11° 0
5 4	8	7	15	9	9 30	13	8	10 0	13	11	10 53	16	2	11 24	16	4 12° 0
6 2	8	59	16	7	10 27	14	3	10 52	14	6	11 54	16	8	—	—	13° 0
17 0	9	51	17	5	11 16	14	10	11 40	15	1	0 20	16	11	0 45	17	3 14° 0
17 10	10	41	18	1	—	—	—	0 4	15	4	1 9	17	8	1 34	18	0 15° 0
18 5	11	32	18	8	0 27	15	7	0 50	15	10	1 56	18	4	2 17	18	7 16° 0
18 10	—	—	—	—	1 13	16	0	1 36	16	2	2 41	18	11	3 4	19	2 17° 0
19 0	0	46	19	0	1 59	16	3	2 20	16	3	3 28	19	4	3 50	19	5 18° 0
19 0	1	38	18	11	2 42	16	3	3 4	16	3	4 12	19	5	4 35	19	5 19° 0
3 18	10	2 29	18	7	3 27	16	1	3 51	15	11	4 57	19	4	5 23	19	2 20° 0
6 18	3	3 21	17	10	4 18	15	8	4 44	15	5	5 49	18	11	6 15	18	8 21° 0
6 17	4	4 12	16	11	5 10	15	1	5 39	14	10	6 40	18	4	7 8	18	0 22° 0
17 16	5	5 2	16	0	6 8	14	6	6 39	14	3	7 36	17	8	8 7	17	4 23° 0
29 15	5	5 58	15	6	7 10	14	0	7 44	13	11	8 37	17	1	9 13	16	11 24° 0
29 15	6	7 6	15	7	8 19	13	10	8 54	13	11	9 48	16	8	10 21	16	8 25° 0
41 15	10	8 15	16	1	9 31	14	1	10 3	14	3	10 56	16	8	11 30	16	9 26° 0
n Spring } 9ft. 4in.					8ft. 0in.					9ft. 7in.						
ge.																

## Equation of Time at Noon.

S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
25		9	1 1		17	0 38		25	2 21	
16		10	0 49		18	0 51		26	2 34	
6		11	0 37		19	1 4		27	2 46	
56		12	0 25		20	1 17		28	2 58	
46		13	0 12		21	1 30		29	3 10	
35		14	0 0		22	1 43		30	3 22	
24		15	0 13	Sub.	23	1 56				
12		16	0 26		24	2 8				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m.     SHEERNESS subtract 3 m.     LONDON 0 m.



JUNE, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.											
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.							
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.						
W.	1	9m20	9	10	9	9	32	10	11	3	21	18	10	3	53	19	2	0	13	12	8	0	43	12	11	
Th.	2	10 13	10	3	11	1	10	31	11	2	4	23	19	5	4	49	19	8	1	13	13	1	1	42	13	2
F.	3	11 6	10	56	11	3	11	20	11	4	5	13	19	11	5	36	20	1	2	7	13	5	2	32	13	7
S.	4	12 0	11	45	11	5	—	—	—	—	6	1	20	2	6	25	20	2	2	57	13	9	3	18	13	9
♄.	5	0a52	0	8	11	5	0	28	11	4	6	46	20	2	7	8	20	1	3	38	13	10	3	59	13	10
M.	6	1 43	0	49	11	3	1	10	11	2	7	29	20	0	7	48	19	11	4	19	13	10	4	37	13	9
Tu.	7	2 32	1	29	11	1	1	47	11	0	8	6	19	9	8	24	19	6	4	55	13	7	5	14	13	4
W.	8	3 18	2	6	10	10	2	25	10	9	8	43	19	4	9	2	19	0	5	33	13	1	5	52	12	10
Th.	9	4 3	2	44	10	7	3	2	10	6	9	21	18	8	9	40	18	4	6	11	12	8	6	32	12	5
F.	10	4 45	3	22	10	4	3	42	10	3	9	59	18	0	10	21	17	8	6	54	12	2	7	17	12	0
S.	11	5 27	4	2	10	1	4	23	10	0	10	44	17	4	11	9	17	1	7	40	11	9	8	2	11	6
♄.	12	6 9	4	43	9	11	5	6	9	10	11	36	16	10	—	—	—	8	26	11	4	8	52	11	3	8
M.	13	6 52	5	30	9	9	5	56	9	8	0	5	16	7	0	34	16	5	9	20	11	1	9	51	11	8
Tu.	14	7 37	6	26	9	8	7	0	9	9	1	3	16	4	1	32	16	4	10	22	11	0	10	52	11	0
W.	15	8 24	7	33	9	10	8	6	9	11	2	1	16	5	2	30	16	8	11	23	11	2	11	51	11	5
Th.	16	9 14	8	37	10	1	9	7	10	3	2	59	17	1	3	28	17	7	—	—	—	0	19	11	9	9
F.	17	10 8	9	34	10	5	10	1	10	8	3	56	18	1	4	21	18	6	0	46	12	1	1	12	12	5
S.	18	11 5	10	27	10	10	10	52	11	0	4	45	18	11	5	8	19	4	1	37	12	9	2	3	13	1
♄.	19	morn.	11	16	11	2	11	40	11	4	5	32	19	9	5	56	20	1	2	28	13	4	2	52	13	8
M.	20	0 4	—	—	—	—	0	3	11	6	6	20	20	4	6	44	20	7	3	14	13	11	3	36	14	6
Tu.	21	1 3	0	26	11	7	0	49	11	8	7	7	20	11	7	31	21	1	3	58	14	5	4	21	14	7
W.	22	2 2	1	12	11	8	1	35	11	7	7	54	21	2	8	15	21	3	4	43	14	8	5	5	14	7
Th.	23	2 58	1	57	11	7	2	21	11	6	8	38	21	2	9	2	20	11	5	28	14	5	5	53	14	5
F.	24	3 52	2	46	11	5	3	10	11	4	9	27	20	8	9	53	20	3	6	18	14	1	6	46	13	12
S.	25	4 45	3	36	11	2	4	1	11	1	10	19	19	11	10	46	19	6	7	14	13	7	7	42	13	3
♄.	26	5 36	4	26	10	11	4	52	10	9	11	16	19	0	11	49	18	7	8	11	12	11	8	40	12	7
M.	27	6 26	5	20	10	7	5	48	10	5	—	—	—	0	24	18	2	9	11	12	4	9	42	12	4	7
Tu.	28	7 17	6	17	10	4	6	51	10	3	0	55	17	10	1	25	17	7	10	15	11	11	10	47	11	12
W.	29	8 9	7	28	10	3	8	3	10	3	1	55	17	6	2	26	17	7	11	19	11	10	11	51	11	1
Th.	30	9 1	8	38	10	4	9	10	10	5	2	59	17	9	3	31	18	1	—	—	—	0	22	12	—	—
Half Mean Spring } Rang			5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.											
			Phases of the Moon.						Moon's Declination at Noon.																	
			D. H. M.						M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°							
New - - - -			4 11 40 Morning.						1	14	N. 13	9	11	N. 3	17	18	S. 22	25	0	S.						
First Quarter			12 11 48 Morning.						2	17	14	10	7	22	18	19	56	26	4	N. 4						
Full - - - -			19 10 54 Afternoon.						3	19	16	11	3	24	19	20	19	27	9	1						
Last Quarter			26 2 15 Afternoon.						4	20	15	12	0	S. 43	20	19	24	28	13	1						
									5	20	9	13	4	51	21	17	13	29	16	1						
									6	19	3	14	8	52	22	13	54	30	18	1						
In Apogee - -			10 3 0 Afternoon.						7	17	3	15	12	35	23	9	44									
In Perigee - -			22 1 0 Afternoon.						8	14	20	16	15	50	24	5	1									

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—

HARWICH subtract 5 m.

HULL add 1 m.

SUNDERLAND add 5 m.

JUNE, 1864.

WEEK DAY.	MONTH DAY.	NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
		MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
		Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.		
V.	1	0 28	11 7		0 56	11 9		11 49	14 6		—	—		5 22	11 2		6 18	11 6		26.5
S.	2	1 23	11 11		1 48	12 1		0 17	14 9		0 42	15 0		6 41	11 10		7 2	12 1		27.5
F.	3	2 11	12 3		2 34	12 6		1 6	15 3		1 30	15 6		7 22	12 5		7 45	12 8		28.5
W.	4	2 57	12 7		3 19	12 8		1 54	15 8		2 17	15 9		8 5	12 9		8 25	12 9		●
Th.	5	3 39	12 9		4 0	12 8		2 38	15 9		2 57	15 9		8 45	12 8		9 4	12 7		1.0
F.	6	4 20	12 7		4 39	12 5		3 15	15 7		3 34	15 5		9 23	12 5		9 42	12 3		2.0
S.	7	4 58	11 3		5 18	12 1		3 52	15 3		4 12	15 0		10 2	12 0		10 22	11 9		3.0
W.	8	5 38	11 11		5 57	11 9		4 32	14 10		4 51	14 8		10 42	11 6		11 1	11 3		4.0
Th.	9	6 15	11 7		6 35	11 4		5 9	14 5		5 30	14 3		11 22	11 0		11 44	10 9		5.0
F.	10	6 56	11 2		7 19	10 11		5 52	14 0		6 15	13 8		—	—		0 7	10 6		6.0
S.	11	7 43	10 8		8 7	10 5		6 39	13 5		7 2	13 2		0 30	10 3		0 53	10 0		7.0
W.	12	8 33	10 2		9 1	10 0		7 28	12 11		7 55	12 9		1 18	9 10		1 46	9 8		8.0
Th.	13	9 31	9 11		10 3	9 11		8 24	12 8		8 56	12 7		2 15	9 7		2 48	9 6		9.0
F.	14	10 34	10 0		11 4	10 1		9 28	12 7		9 59	12 8		3 23	9 6		3 57	9 6		10.0
S.	15	11 36	10 3		—	—		10 29	12 10		10 58	13 1		4 29	9 7		5 0	9 9		11.0
W.	16	0 5	10 6		0 33	10 9		11 26	13 4		11 53	13 7		5 28	9 11		5 54	10 4		12.0
Th.	17	0 58	11 0		1 22	11 3		—	—		0 16	13 11		6 18	10 9		6 38	11 2		13.0
F.	18	1 44	11 6		2 7	11 10		0 39	14 4		1 2	14 9		6 59	11 8		7 20	12 1		14.0
S.	19	2 31	12 3		2 53	12 7		1 26	15 3		1 50	15 7		7 40	12 7		8 1	12 11		15.0
W.	20	3 14	12 9		3 36	13 1		2 12	15 11		2 34	16 2		8 23	13 2		8 45	13 4		16.0
Th.	21	3 59	13 3		4 22	13 5		2 56	16 4		3 18	16 5		9 7	13 5		9 30	13 5		17.0
F.	22	4 45	13 4		5 8	13 3		3 40	16 5		4 3	16 4		9 53	13 4		10 17	13 3		18.0
S.	23	5 32	13 2		5 57	13 1		4 27	16 3		5 52	16 2		10 43	13 0		11 8	12 10		19.0
W.	24	6 22	12 11		6 49	12 9		5 17	16 0		6 44	15 9		11 36	12 6		—	—		20.0
Th.	25	7 16	12 6		7 44	12 2		6 12	15 5		7 41	15 1		0 4	12 3		0 32	11 11		21.0
F.	26	8 15	11 9		8 46	11 5		7 10	14 8		8 45	14 4		1 2	11 6		1 32	11 3		22.0
S.	27	9 19	11 2		9 52	10 11		8 13	14 0		9 53	13 6		2 4	10 11		2 36	10 8		23.0
W.	28	10 26	10 10		10 59	10 10		9 20	13 7		10 58	13 7		3 13	10 6		3 51	10 4		24.0
Th.	29	11 32	10 10		—	—		10 25	13 6		12 0	13 10		4 26	10 3		5 1	10 3		25.0
F.	30	0 6	10 11		0 36	11 1		11 29	13 8		—	—		5 31	10 4		6 2	10 7		26.0
		Half Mean Spring } Range.						8ft. 2in.						6ft. 7in.						

Half Mean Spring } 6ft. 8in.  
Range.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M.D.	M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
1	2 25	Add.	9	1 1	Add.	17	0 38	Sub.	25	2 21	Sub.
2	2 16		10	0 49		18	0 51		26	2 34	
3	2 6		11	0 37		19	1 4		27	2 46	
4	1 56		12	0 25		20	1 17		28	2 58	
5	1 46		13	0 12		21	1 30		29	3 10	
6	1 35		14	0 0		22	1 43		30	3 22	
7	1 24		15	0 13	Sub.	23	1 56				
8	1 12		16	0 26		24	2 8				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.

JUNE, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTER.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.							
W.	19	m20	9	1	9	1	9	33	9	2	8	28	23	5	8	56	23	10	2	56	18	3	3	29			
Th.	20	10 13	10	2	9	3	10	27	9	3	9	22	24	2	9	45	24	6	4	1	19	1	4	28			
F.	31	6 10	52	9	4	11	19	9	4	10	9	24	9	10	33	24	11	4	55	19	9	5	24				
S.	4	12 0	11	43	9	4	—	—	—	10	56	24	11	11	18	25	0	5	48	20	0	6	9				
S.	5	0a52	0	6	9	5	0	28	9	5	11	39	25	0	12	0	24	10	6	30	20	1	6	51			
M.	6	1 43	0	49	9	5	1	8	9	5	—	—	—	0	19	24	9	7	9	19	11	7	27				
Tu.	7	2 32	1	27	9	4	1	46	9	4	0	38	24	7	0	57	24	3	7	46	19	5	8	5			
W.	8	3 18	2	5	9	3	2	23	9	2	1	15	23	11	1	33	23	7	8	24	18	11	8	43			
Th.	9	4 3	2	41	9	1	2	59	9	0	1	51	23	2	2	10	22	10	9	2	18	4	9	20			
F.	10	4 45	3	18	8	11	3	39	8	10	2	39	22	5	2	49	22	0	9	40	17	7	9	59			
S.	11	5 27	4	0	8	9	4	21	8	8	3	10	21	7	3	31	21	2	10	18	16	11	10	37			
S.	12	6 9	4	42	8	7	5	5	8	6	3	54	20	9	4	20	20	5	10	57	16	2	11	19			
M.	13	6 52	5	31	8	5	5	59	8	4	4	48	20	2	5	20	20	1	11	44	15	8	—				
Tu.	14	7 37	6	29	8	3	6	59	8	2	5	53	20	1	6	28	20	3	0	11	15	7	0	40			
W.	15	8 24	7	32	8	3	8	4	8	4	7	220	6	7	33	20	11	1	16	15	9	1	52				
Th.	16	9 14	8	35	8	6	9	4	8	8	8	4	21	5	8	30	22	0	2	27	16	6	2	58			
F.	17	10 8	9	31	8	10	9	57	8	11	8	55	22	7	9	19	23	2	3	27	17	7	3	55			
S.	18	11 5	10	23	9	1	10	48	9	2	9	42	23	9	10	5	24	4	4	23	18	9	4	51			
S.	19	morn.	11	13	9	4	11	38	9	5	10	28	24	9	10	52	25	2	5	17	19	10	5	43			
M.	20	0 4	—	—	0	3	9	7	11	15	15	25	7	11	39	26	0	6	7	20	7	6	30				
Tu.	21	1 3	0	27	9	8	0	51	9	9	—	—	—	0	2	26	3	6	54	21	3	7	16				
W.	22	2 2	1	14	9	10	1	37	9	11	0	25	26	5	0	48	26	5	7	38	21	4	8	1			
Th.	23	2 58	2	0	9	11	2	24	9	11	1	11	26	4	1	35	26	0	8	25	21	2	8	49			
F.	24	3 52	2	48	9	10	3	12	9	9	1	58	25	9	2	23	25	3	9	15	20	6	9	39			
S.	25	4 45	3	37	9	8	4	3	9	6	2	48	24	10	3	14	24	4	10	3	19	7	10	27			
S.	26	5 36	4	29	9	4	4	56	9	3	3	40	23	8	4	8	23	10	51	18	6	11	15				
M.	27	6 26	5	23	9	1	5	51	8	11	4	38	22	6	5	9	22	0	11	39	17	5	—				
Tu.	28	7 17	6	22	8	9	6	54	8	7	5	44	21	9	6	21	21	7	0	5	17	1	0	35			
W.	29	8 9	7	28	8	7	8	5	8	7	6	58	21	8	7	34	21	9	1	12	16	9	1	53			
Th.	30	9 1	8	39	8	8	9	12	8	9	8	7	22	1	8	38	22	5	2	30	17	1	3	7			
Half Mean Spring Range.			4ft. 10in.								13ft. 0in.								10ft. 6in.								
Phases of the Moon.												Moon's Declination at Noon.															
D. H. M.												M.D. ° ' "															
New - - - - - 4 11 40 Morning.												1 14 N. 13 9 11 N. 3 17 18 S. 22 25															
First Quarter - 12 11 48 Morning.												2 17 14 10 7 22 18 19 56 26															
Full - - - - - 19 10 54 Afternoon.												3 19 16 11 3 24 19 20 19 27															
Last Quarter - 26 2 15 Afternoon.												4 20 15 12 0 S. 43 20 19 24 28															
In Apogee - - 10 3 0 Afternoon.												5 20 9 13 4 51 21 17 13 29															
In Perigee - - 22 1 0 Afternoon.												6 19 3 14 8 52 22 13 54 30															
												7 17 3 15 12 35 23 9 44															
												8 14 20 16 15 50 24 5 1															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

JUNE, 1864.

VESTON-SUPER-MARE.					HOLYHEAD.					KINGSTOWN.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	D.	
3 32 32 10		4 7 33 4			4 7 24 14 6		7 52 14 9			8 14 10 0		8 45 10 2		26.5	
4 41 34 0		5 9 34 7			7 8 18 14 11		8 41 15 1			9 15 10 3		9 40 10 4		27.5	
5 37 35 2		6 5 35 6			6 9 3 15 3		9 27 15 4			10 3 10 6		10 26 10 7		28.5	
5 30 35 7		6 52 35 7			7 9 50 15 5		10 11 15 5			10 47 10 8		11 7 10 8		●	
7 14 35 8		7 35 35 8			8 10 30 15 5		10 47 15 4			11 28 10 8		11 48 10 7		1.0	
7 53 35 6		8 11 35 3			3 11 5 15 2		11 23 15 0			—		0 7 10 6		2.0	
8 29 34 11		8 47 34 7			7 11 43 14 10		—			0 26 10 5		0 46 10 3		3.0	
9 43 34 3		9 20 33 10			10 0 3 14 8		0 23 14 6			1 6 10 2		1 26 10 0		4.0	
9 37 33 3		9 54 32 8			8 0 43 14 3		1 4 14 0			1 44 9 10		2 4 9 8		5.0	
0 11 32 1		10 28 31 5			5 1 26 13 9		1 49 13 6			2 26 9 7		2 49 9 5		6.0	
0 45 30 9		11 4 30 2			2 2 12 13 4		2 35 13 1			3 11 9 4		3 34 9 3		7.0	
1 26 29 8		11 51 29 2			2 2 59 12 11		3 27 12 9			3 58 9 1		4 25 9 0		8.0	
—		0 19 28 10			3 56 12 8		4 29 12 7			4 54 8 10		5 23 8 10		9.0	
0 48 28 9		1 19 28 9			9 5 1 12 8		5 32 12 9			5 52 8 10		6 21 8 11		10.0	
1 53 29 0		2 26 29 6			6 6 3 12 11		6 32 13 2			6 50 9 1		7 19 9 3		11.0	
2 59 30 1		3 32 30 10			10 7 0 13 4		7 26 13 8			7 48 9 5		8 16 9 7		12.0	
4 43 1 7		4 34 32 7			7 7 51 14 0		8 14 14 4			8 43 9 9		9 10 9 11		13.0	
5 33 3 6		5 32 34 5			5 8 37 14 8		9 0 15 0			9 36 10 1		10 0 10 4		14.0	
5 59 35 3		6 25 35 10			9 9 23 15 4		9 45 15 7			10 22 10 6		10 43 10 8		15.0	
6 49 36 6		7 13 37 10			10 10 8 15 9		10 29 16 0			11 5 10 11		11 27 11 0		16.0	
7 37 37 8		7 59 37 10			10 10 50 16 2		11 11 16 2			11 50 11 0		—		17.0	
8 21 37 11		8 43 38 0			11 11 33 16 2		11 58 16 2			0 14 11 0		0 37 11 0		18.0	
9 6 37 9		9 28 37 6			6 — — —		0 24 16 0			1 1 10 11		1 26 10 10		19.0	
9 51 36 10		10 13 36 3			3 0 50 15 10		1 18 15 7			1 51 10 8		2 18 10 6		20.0	
0 34 35 5		10 56 34 5			5 1 46 15 3		2 14 15 0			2 46 10 5		3 14 10 3		21.0	
1 19 33 6		11 44 32 6			6 2 43 14 7		3 13 14 3			3 42 10 0		4 11 9 10		22.0	
—		0 11 31 9			9 3 45 14 0		4 17 13 9			4 44 9 8		5 15 9 6		23.0	
0 41 31 2		1 14 30 9			9 4 53 13 8		5 26 13 7			5 45 9 4		6 16 9 4		24.0	
1 49 30 8		2 26 31 8			5 59 13 7		6 33 13 8			6 47 9 5		7 20 9 6		25.0	
3 33 1 0		3 41 31 5			5 7 3 13 9		7 34 13 11			7 52 9 7		8 24 9 8		26.0	
Mean Spring } 18 ft. 7 in. Range.					8 ft. 0 in.					5 ft. 6 in.					

Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
2 25		9	1 1		17	0 38		25	2 21	
2 16		10	0 49		18	0 51		26	2 34	
2 6		11	0 37		19	1 4		27	2 46	
1 56		12	0 25		20	1 17		28	2 58	
1 46		13	0 12		21	1 30		29	3 10	
1 35		14	0 0		22	1 43		30	3 22	
1 24		15	0 13	Sub.	23	1 56				
1 12		16	0 26		24	2 8				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 -SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

JUNE, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																					
W.	1	9m20	7 58	8 8	8 26	8 10	5 12	7 0	5 37	7 1	2 30	9 9	2 57	10 0																											
Th.	2	10 13	8 52	9 0	9 15	9 1	6 1	7 2	6 26	7 3	3 21	10 2	3 43	10 4																											
F.	3	11 6	9 39	9 2	10 4	9 3	6 51	7 4	7 17	7 4	4 5	10 7	4 29	10 8																											
S.	4	12 0	10 26	9 3	10 47	9 3	7 40	7 5	8 0	7 5	4 53	10 9	5 14	10 10																											
S.	5	0a52	11 7	9 3	11 25	9 2	8 20	7 5	8 38	7 4	5 35	10 10	5 55	10 9																											
M.	6	1 43	11 43	9 2	—	—	8 55	7 3	9 12	7 1	6 13	10 8	6 31	10 6																											
Tu.	7	2 32	0 1	9 1	0 21	9 0	9 30	6 11	9 48	6 10	6 51	10 3	7 11	10 3																											
W.	8	3 18	0 42	9 0	1 2	8 11	10 5	6 8	10 23	6 7	7 29	9 10	7 47	9 7																											
Th.	9	4 3	1 22	8 10	1 43	8 9	10 43	6 5	11 5	6 3	8 6	9 4	8 27	9 2																											
F.	10	4 45	2 7	8 8	2 31	8 7	11 32	6 1	12 0	5 10	8 50	8 11	9 15	8 8																											
S.	11	5 27	2 54	8 5	3 17	8 4	—	—	0 29	5 8	9 40	8 7	10 7	8 6																											
S.	12	6 9	3 41	8 3	4 7	8 2	1 0	5 7	1 32	5 7	10 36	8 5	11 6	8 4																											
M.	13	6 52	4 35	8 2	5 4	8 1	2 8	5 7	2 41	5 8	11 37	8 4	—	—																											
Tu.	14	7 37	5 34	8 1	6 3	8 1	3 11	5 9	3 39	5 11	0 7	8 4	0 37	8 2																											
W.	15	8 24	6 34	8 1	7 5	8 2	4 7	6 1	4 31	6 3	1 8	8 6	1 38	8 2																											
Th.	16	9 14	7 34	8 3	8 1	8 4	4 55	6 5	5 16	6 7	2 7	8 11	2 33	9 2																											
F.	17	10 8	8 25	8 6	8 48	8 9	5 37	6 8	5 58	6 10	2 56	9 5	3 18	9 2																											
S.	18	11 5	9 12	8 11	9 36	9 1	6 22	7 0	6 47	7 2	3 40	10 0	4 2	10 4																											
S.	19	morn.	9 59	9 3	10 21	9 4	7 11	7 4	7 35	7 5	4 25	10 7	4 48	10 12																											
M.	20	0 4	10 44	9 5	11 6	9 5	7 58	7 7	8 20	7 9	5 12	11 1	5 35	11 3																											
Tu.	21	1 3	11 28	9 6	11 50	9 6	8 41	7 10	9 1	7 9	5 58	11 4	6 20	11 4																											
W.	22	2 2	—	—	0 12	9 6	9 22	7 8	9 43	7 7	6 42	11 3	7 6	11 3																											
Th.	23	2 58	0 37	9 6	1 3	9 5	10 6	7 6	10 30	7 5	7 30	10 11	7 54	10 8																											
F.	24	3 52	1 29	9 5	1 57	9 4	10 57	7 3	11 25	7 1	8 20	10 6	8 47	10 3																											
S.	25	4 45	2 27	9 3	2 56	9 1	11 59	6 10	—	—	9 15	10 0	9 47	9 8																											
S.	26	5 36	3 25	8 11	3 55	8 9	0 35	6 6	1 12	6 4	10 20	9 6	10 55	9 2																											
M.	27	6 26	4 26	8 8	4 56	8 7	1 51	6 3	2 29	6 2	11 28	9 2	12 0	9 2																											
Tu.	28	7 17	5 27	8 6	5 57	8 5	3 4	6 3	3 35	6 4	—	—	0 31	9 2																											
W.	29	8 9	6 30	8 4	7 6	8 4	4 4	6 5	4 32	6 6	1 4	9 0	1 38	9 2																											
Th.	30	9 1	7 37	8 4	8 8	8 5	4 57	6 7	5 22	6 8	2 10	9 2	2 40	9 2																											
Half Mean Spring } Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
D. H. M.																					M. D. ° ' M. D.																				

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—  
**BELFAST** subtract 2 m.      |      **LONDONDERRY** add 4 m.      |      **SLIGO BAY** add 9 m.

JUNE, 1864.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age at Noon.				
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.							
no.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	D.					
41	12 11	2 9 13	2	1 53 10	5	2 25 10	7	2 3 11	2	2 37 11	4	26° 5							
37	13 5	3 2 13	7	2 55 10	9	3 20 10	11	3 10 11	6	3 38 11	8	27° 5							
26	13 9	3 50 13	11	3 46 11	1	4 13 11	2	4 6 11	10	4 34 11	11	28° 5							
13	14 0	4 33 14	1	4 36 11	3	4 58 11	4	4 59 11	11	5 20 11	11		●						
54	14 2	5 15 14	1	5 20 11	4	5 41 11	3	5 41 11	11	6 2 11	11	1° 0							
34	14 0	5 52 13	10	6 0 11	2	6 19 11	1	6 21 11	11	6 40 11	10	2° 0							
11	13 7	6 31 13	5	6 38 11	0	6 57 10	10	7 0 11	9	7 18 11	8	3° 0							
50	13 2	7 9 12	11	7 15 10	8	7 33 10	6	7 36 11	7	7 53 11	6	4° 0							
29	12 9	7 51 12	5	7 52 10	4	8 11 10	2	8 11 11	4	8 29 11	2	5° 0							
14	12 1	8 36 11	9	8 30 10	0	8 50 9	10	8 48 11	0	9 6 10	10	6° 0							
58	11 5	9 21 11	2	9 10 9	8	9 29 9	6	9 24 10	8	9 45 10	6	7° 0							
46	11 0	10 14 10	10	9 51 9	4	10 15 9	3	10 9 10	4	10 37 10	2	8° 0	☾						
45	10 10	11 16 10	10	10 44 9	2	11 14 9	2	11 5 10	0	11 33 9	11	9° 0							
48	10 11	—	—	11 45 9	2	—	—	—	—	0 1 9	10	10° 0							
20	11 1	0 50 11	4	0 17 9	3	0 50 9	5	0 30 10	0	1 11 10	1	11° 0							
18	11 8	1 44 12	0	1 23 9	7	1 54 9	9	1 32 10	4	2 3 10	7	12° 0							
8	12 4	2 33 12	9	2 23 10	0	2 50 10	4	2 34 10	10	3 4 11	1	13° 0							
58	13 1	3 22 13	6	3 16 10	7	3 42 10	10	3 33 11	4	4 1 11	7	14° 0							
45	13 10	4 8 14	2	4 7 11	1	4 31 11	4	4 28 11	10	4 54 12	0	15° 0	○						
31	14 6	4 54 14	9	4 55 11	7	5 19 11	9	5 18 12	2	5 41 12	4	16° 0							
17	14 11	5 40 15	1	5 43 11	10	6 7 11	11	6 4 12	6	6 27 12	7	17° 0							
3	15 1	6 26 15	0	6 29 11	11	6 52 11	11	6 50 12	8	7 13 12	8	18° 0							
51	14 10	7 16 14	8	7 16 11	9	7 40 11	8	7 37 12	8	8 1 12	7	19° 0							
43	14 5	8 11 14	1	8 5 11	6	8 30 11	3	8 25 12	5	8 48 12	3	20° 0							
39	13 7	9 7 13	1	8 54 11	c	9 19 10	9	9 11 12	0	9 34 11	9	21° 0							
35	12 8	10 5 12	4	9 44 10	6	10 9 10	3	9 59 11	6	10 28 11	2	22° 0	☾						
35	12 1	11 8 11	11	10 35 10	0	11 7 9	10	10 57 10	11	11 27 10	8	23° 0							
42	11 10	—	—	11 40 9	9	—	—	11 57 10	6	—	—	24° 0							
16	11 10	0 50 11	11	0 14 9	9	0 51 9	9	0 27 10	6	1 1 10	6	25° 0							
21	12 1	1 51 12	4	1 27 9	10	2 3 10	0	1 35 10	7	2 12 10	9	26° 0							
Mean Spring Tide.					7ft. 5in.					5ft. 10in.					6ft. 2in.				

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
2 25		9	1 1		17	0 38		25	2 21	
2 16		10	0 49		18	0 51		26	2 34	
2 6		11	0 37		19	1 4		27	2 46	
1 56		12	0 25		20	1 17		28	2 58	
1 46		13	0 12		21	1 30		29	3 10	
1 35		14	0 0		22	1 43		30	3 22	
1 24		15	0 13	Sub.	23	1 56				
1 12		16	0 26		24	2 8				

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 ALWAYS add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.



JULY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.																								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																				
			H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																				
F.	1	9m54	9 44	8 10	10 12	8 11	9 7	22 9	9 32	23 1	3 40	17 10	4 11																										
S.	2	10 46	10 38	9 0	11 3	9 0	9 57	23 6	10 19	23 9	4 40	18 6	5 6																										
☾	3	11 37	11 27	9 1	11 50	9 2	10 41	23 11	11 3	24 1	5 31	19 1	5 55																										
M.	4	12 26	—	—	0 11	9 3	11 23	24 3	11 43	24 5	6 15	19 6	6 34																										
Tu.	5	1 13	0 32	9 3	0 52	9 4	—	—	0 3	24 6	6 54	19 8	7 11																										
W.	6	1 58	1 10	9 4	1 28	9 4	0 20	24 6	0 38	24 6	7 28	19 7	7 45																										
Th.	7	2 42	1 45	9 4	2 1	9 4	0 55	24 4	1 11	24 2	8 2	19 5	8 19																										
F.	8	3 24	2 18	9 3	2 35	9 3	1 28	24 0	1 45	23 9	8 36	19 1	8 54																										
S.	9	4 6	2 53	9 2	3 10	9 1	2 3	23 5	2 20	23 1	9 12	18 6	9 28																										
☾	10	4 48	3 26	9 0	3 44	8 11	2 37	22 9	2 54	22 4	9 45	17 10	10 3																										
M.	11	5 31	4 3	8 10	4 24	8 9	3 14	21 11	3 35	21 6	10 22	17 2	10 42																										
Tu.	12	6 16	4 46	8 8	5 10	8 6	3 58	21 0	4 24	20 7	11 3	16 3	11 25																										
W.	13	7 3	5 35	8 5	6 5	8 4	4 52	20 3	5 26	20 0	11 50	15 7	—																										
Th.	14	7 54	6 38	8 3	7 11	8 2	6 3	20 1	6 40	20 3	0 20	15 7	0 53																										
F.	15	8 49	7 46	8 3	8 22	8 5	7 16	20 8	7 50	21 2	1 32	15 9	2 11																										
S.	16	9 47	8 55	8 7	9 28	8 9	8 24	21 9	8 53	22 6	2 48	16 9	3 23																										
☾	17	10 46	9 58	9 0	10 27	9 2	9 21	23 3	9 47	24 1	3 56	18 3	4 27																										
M.	18	11 46	10 54	9 4	11 20	9 6	10 11	24 9	10 35	25 5	4 57	19 9	5 24																										
Tu.	19	morn.	11 46	9 8	—	—	10 59	26 0	11 24	26 7	5 51	21 0	6 16																										
W.	20	0 45	0 12	9 10	0 36	10 0	11 48	27 0	—	—	6 39	21 11	7 2																										
Th.	21	1 42	1 0	10 1	1 24	10 2	0 11	27 4	0 35	27 6	7 25	22 4	7 48																										
F.	22	2 37	1 47	10 2	2 10	10 2	0 58	27 7	1 21	27 4	8 11	22 2	8 32																										
S.	23	3 30	2 33	10 1	2 57	10 0	1 44	26 11	2 7	26 5	8 59	21 6	9 23																										
☾	24	4 22	3 20	9 10	3 42	9 8	2 30	25 9	2 52	25 0	9 43	20 3	10 4																										
M.	25	5 14	4 4	9 6	4 28	9 4	3 15	24 3	3 39	23 6	10 27	18 11	10 51																										
Tu.	26	6 6	4 55	9 1	5 22	8 10	4 6	22 7	4 36	21 10	11 14	17 4	11 38																										
W.	27	6 58	5 51	8 8	6 25	8 5	5 9	21 2	5 47	20 9	—	—	0 8																										
Th.	28	7 50	7 1	8 3	7 39	8 3	6 29	20 6	7 9	20 6	0 42	15 10	1 21																										
F.	29	8 42	8 18	8 4	8 54	8 5	7 46	20 9	8 23	21 1	2 7	15 11	2 41																										
S.	30	9 33	9 27	8 6	9 57	8 8	8 52	21 7	9 20	22 1	3 22	16 8	3 54																										
☾	31	10 22	10 24	8 9	10 48	8 10	9 45	22 7	10 7	23 1	4 24	17 8	4 56																										
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.																								
Phases of the Moon.																				Moon's Declination at Noon.																			
D. H. M.																				M.D. ° ' M.D. ° ' M.D. ° ' M.D. ° '																			
New - - - - - 12 0 24 Morning.																				1 20 N. 3 9 0 N. 44 17 19 S. 54 25																			
First Quarter - 4 3 51 Morning.																				2 20 17 10 3 S. 22 18 18 17 26																			
Full - - - - - 19 6 36 Morning.																				3 19 30 11 7 22 19 15 24 27																			
Last Quarter - 25 8 46 Afternoon.																				4 17 49 12 11 9 20 11 28 28																			
																				5 15 20 13 14 32 21 6 48 29																			
In Apogee - - 8 8 0 Morning.																				6 12 14 14 17 20 22 1 47 30																			
In Perigee - - 20 2 0 Afternoon.																				7 8 40 15 19 18 23 3 N. 15 31																			
																				8 4 47 16 20 13 24 8 0																			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add

JULY, 1864.

WESTON-SUPER-MARE.						HOLYHEAD.						KINGSTOWN.						C's Age At Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		
18 31 11	4 51 32	6	8 3 14	1	8 28 14	3	8 56 9	9	9 25 9	9 11	27 0	9 25 9	9 11	27 0	9 25 9	9 11	27 0	
21 33 2	5 47 33	8	8 52 14	6	9 14 14	8	9 52 10	0	10 14 10	2	28 0	9 52 10	0	10 14 10	2	28 0		
12 34 0	6 37 34	4	9 36 14	9	9 57 14	11	10 34 10	3	10 53 10	4	29 0	10 34 10	3	10 53 10	4	29 0		
58 34 7	7 18 34	10	10 16 15	0	10 34 15	11	11 13 10	5	11 32 10	6		11 13 10	5	11 32 10	6		●	
38 35 1	7 54 35	1	10 52 15	1	11 7 15	11	11 51 10	5	—	—	1 5	11 51 10	5	—	—		1 5	
11 35 1	8 28 35	0	11 23 15	0	11 41 14	11	0 9 10	5	0 27 10	4	2 5	0 9 10	5	0 27 10	4	2 5		
44 34 11	9 0 34	8	11 59 14	10	—	—	0 44 10	3	1 2 10	3	3 5	0 44 10	3	1 2 10	3	3 5		
16 34 6	9 32 34	2	0 17 14	9	0 36 14	7	1 20 10	2	1 38 10	0	4 5	1 20 10	2	1 38 10	0	4 5		
48 33 8	10 2 33	2	0 56 14	5	1 15 14	2	1 57 9	11	2 15 9	9	5 5	1 15 14	2	1 57 9	11	2 15 9		
17 32 7	10 32 31	11	1 34 14	0	1 54 13	9	2 34 9	8	2 54 9	7	6 5	1 54 13	9	2 34 9	8	2 54 9		
50 31 3	11 9 30	6	2 15 13	6	2 38 13	3	3 14 9	5	3 37 9	4	7 5	2 38 13	3	3 14 9	5	3 37 9		
30 29 10	11 55 29	3	3 3 13	0	3 31 12	10	4 1 9	2	4 29 9	0	8	3 31 12	10	4 1 9	2	4 29 9		
—	0 25 28	10	4 0 12	8	4 35 12	7	4 58 8	11	5 29 8	10	9 5	4 35 12	7	4 58 8	11	5 29 8		
57 28 8	1 31 28	9	5 11 12	8	5 44 12	9	6 1 8	10	6 32 8	11	10 5	5 44 12	9	6 1 8	10	6 32 8		
7 29 1	2 44 29	8	6 17 13	0	6 49 13	3	7 4 9	1	7 36 9	3	11 5	6 49 13	3	7 4 9	1	7 36 9		
22 30 6	3 59 31	6	7 20 13	6	7 49 14	0	8 8 9	6	8 40 9	9	12 5	7 49 14	0	8 8 9	6	8 40 9		
35 32 8	5 8 33	11	8 17 14	5	8 43 14	10	9 11 10	0	9 41 10	3	13 5	8 43 14	10	9 11 10	0	9 41 10		
38 35 1	6 6 36	2	9 6 15	3	9 29 15	8	10 6 10	6	10 28 10	9	14 5	9 29 15	8	10 6 10	6	10 28 10		
33 37 1	6 58 37	11	9 53 16	1	10 16 16	5	10 50 11	0	11 13 11	2	16 5	10 16 16	5	10 50 11	0	11 13 11		
23 38 8	7 46 39	3	10 38 16	8	10 58 16	10	11 36 11	4	11 59 11	4	16 5	10 58 16	10	11 36 11	4	11 59 11		
9 39 6	8 31 39	7	11 20 16	11	11 43 16	11	—	—	0 23 11	5	17 5	11 43 16	11	—	—	0 23 11		
53 39 5	9 15 39	0	—	—	0 9 16	10	0 47 11	4	1 12 11	3	18 5	0 9 16	10	0 47 11	4	1 12 11		
37 38 5	9 59 37	6	0 34 16	6	1 0 16	3	1 36 11	1	2 1 10	11	19 5	1 0 16	3	1 36 11	1	2 1 10		
17 36 6	10 35 35	4	1 25 15	10	1 50 15	5	2 26 10	8	2 50 10	5	20 5	1 50 15	5	2 26 10	8	2 50 10		
55 34 1	11 18 32	10	2 15 14	11	2 42 14	6	3 14 10	2	3 41 9	11	21 5	2 42 14	6	3 14 10	2	3 41 9		
42 31 7	—	—	3 11 14	0	3 43 13	7	4 10 9	8	4 41 9	5	22 5	3 43 13	7	4 10 9	8	4 41 9		
11 30 6	0 44 29	7	4 17 13	3	4 56 13	0	5 14 9	2	5 48 9	0	23 5	4 17 13	3	4 56 13	0	5 14 9		
21 29 2	2 0 29	0	5 34 12	11	6 10 12	11	6 22 9	0	6 57 9	1	24 5	5 34 12	11	6 10 12	11	6 22 9		
40 29 2	3 20 29	7	6 45 13	0	7 19 13	2	7 32 9	2	8 6 9	3	25 5	6 45 13	0	7 19 13	2	7 32 9		
57 30 2	4 32 30	11	7 48 13	5	8 16 13	8	8 38 9	5	9 10 9	7	26 5	7 48 13	5	8 16 13	8	8 38 9		
4 31 9	5 31 32	7	8 41 13	11	9 2 14	3	9 38 9	9	10 1 9	11	27 5	8 41 13	11	9 2 14	3	9 38 9		
an Spring }			18 ft. 7 in.			8 ft. 0 in.			5 ft. 6 in.									

## Equation of Time at Noon.

L. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
3 34	Sub.	9	4 56	Sub.	17	5 51	Sub.	25	6 12	Sub.
3 45		10	5 5		18	5 56		26	6 12	
3 56		11	5 13		19	6 0		27	6 12	
4 7		12	5 20		20	6 3		28	6 11	
4 18		13	5 28		21	6 6		29	6 9	
4 28		14	5 34		22	6 9		30	6 7	
4 38		15	5 40		23	6 10		31	6 4	
4 47		16	5 46		24	6 12				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.



JULY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
F.	1	9m54	9 44	8 10	10 12	8 11	9 7	22 9	9 32	23 1	3 40	17 10	4 11	1
S.	2	10 46	10 38	9 0	11 3	9 0	9 57	23 6	10 19	23 9	4 40	18 6	5 6	1
Mo.	3	11 37	11 27	9 1	11 50	9 2	10 41	23 11	11 3	24 1	5 31	19 1	5 55	1
M.	4	12 26	—	—	0 11	9 3	11 23	24 3	11 43	24 5	6 15	19 6	6 34	1
Tu.	5	1 13	0 32	9 3	0 52	9 4	—	—	0 3	24 6	6 54	19 8	7 11	1
W.	6	1 58	1 10	9 4	1 28	9 4	0 20	24 6	0 38	24 6	7 28	19 7	7 45	1
Th.	7	2 42	1 45	9 4	2 1	9 4	0 55	24 4	1 11	24 2	8 2	19 5	8 19	1
F.	8	3 24	2 18	9 3	2 35	9 3	1 28	24 0	1 45	23 9	8 36	19 1	8 54	1
S.	9	4 6	2 53	9 2	3 10	9 1	2 3	23 5	2 20	23 1	9 12	18 6	9 28	1
Mo.	10	4 48	3 26	9 0	3 44	8 11	2 37	22 9	2 54	22 4	9 45	17 10	10 3	1
M.	11	5 31	4 3	8 10	4 24	8 9	3 14	21 11	3 35	21 6	10 22	17 2	10 42	1
Tu.	12	6 16	4 46	8 8	5 10	8 6	3 58	21 0	4 24	20 7	11 3	16 3	11 25	1
W.	13	7 3	5 35	8 5	6 5	8 4	4 52	20 3	5 26	20 0	11 50	15 7	—	1
Th.	14	7 54	6 38	8 3	7 11	8 2	6 3	20 1	6 40	20 3	0 20	15 7	0 53	1
F.	15	8 49	7 46	8 3	8 22	8 5	7 16	20 8	7 50	21 2	1 32	15 9	2 11	1
S.	16	9 47	8 55	8 7	9 28	8 9	8 24	21 9	8 53	22 6	2 48	16 9	3 23	1
Mo.	17	10 46	9 58	9 0	10 27	9 2	9 21	23 3	9 47	24 1	3 56	18 3	4 27	1
M.	18	11 46	10 54	9 4	11 20	9 6	10 11	24 9	10 35	25 5	4 57	19 9	5 24	2
Tu.	19	morn.	11 46	9 8	—	—	10 59	26 0	11 24	26 7	5 51	21 0	6 16	2
W.	20	0 45	0 12	9 10	0 36	10 0	11 48	27 0	—	—	6 39	21 11	7 22	2
Th.	21	1 42	1 0	10 1	1 24	10 2	0 11	27 4	0 35	27 6	7 25	22 4	7 48	2
F.	22	2 37	1 47	10 2	2 10	10 2	0 58	27 7	1 21	27 4	8 11	22 2	8 35	2
S.	23	3 30	2 33	10 1	2 57	10 0	1 44	26 11	2 7	26 5	8 59	21 6	9 23	2
Mo.	24	4 22	3 20	9 10	3 42	9 8	2 30	25 9	2 52	25 0	9 43	20 3	10 4	2
M.	25	5 14	4 4	9 6	4 28	9 4	3 15	24 3	3 39	23 6	10 27	18 11	10 51	2
Tu.	26	6 6	4 55	9 1	5 22	8 10	4 6	22 7	4 36	21 10	11 14	17 4	11 38	2
W.	27	6 58	5 51	8 8	6 25	8 5	5 9	21 2	5 47	20 9	—	—	0 8	2
Th.	28	7 50	7 1	8 3	7 39	8 3	6 29	20 6	7 9	20 6	0 42	15 10	1 23	2
F.	29	8 42	8 18	8 4	8 54	8 5	7 46	20 9	8 23	21 1	2 7	15 11	2 47	2
S.	30	9 33	9 27	8 6	9 57	8 8	8 52	21 7	9 20	22 1	3 22	16 8	3 54	2
Mo.	31	10 22	10 24	8 9	10 48	8 10	9 45	22 7	10 7	23 1	4 24	17 8	4 50	2
Half Mean Spring Range.			4 ft. 10 in.				13 ft. 0 in.				10 ft. 6 in.			
Phases of the Moon.							Moon's Declination at Noon.							
D. H. M.							M.D. ° '							
New - - - - - 4 0 24 Morning.							1 20 N. 3 9 0 N. 44 17 19 S. 54 25 12							
First Quarter - 12 3 51 Morning.							2 20 17 10 3 S. 22 18 18 17 26 15							
Full - - - - - 19 6 36 Morning.							3 19 30 11 7 22 19 15 24 27 18							
Last Quarter - 25 8 46 Afternoon.							4 17 49 12 11 9 20 11 28 28 19							
							5 15 20 13 14 32 21 6 48 29 20							
In Apogee - - 8 8 0 Morning.							6 12 14 14 17 20 22 1 47 30 19							
In Perigee - - 20 2 0 Afternoon.							7 8 40 15 19 18 23 3 N. 15 31 18							
							8 4 47 16 20 13 24 8 0							

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 2 m.

JULY, 1864.

NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
F. L.	H. M. F. L.		F. L.	H. M. F. L.		F. L.	H. M. F. L.		F. L.	H. M. F. L.		F. L.	H. M. F. L.		F. L.	H. M. F. L.		
6 11 2	1 34 11	4	—	—		0 28 14	1 6 29 10 10	6 52 11 2	27° 0									
8 11 6	2 23 11	9	0 53 14	4		1 18 14	8 7 14 11 6	7 33 11 10	28° 0									
5 11 11	3 5 12	1	1 41 14	11		2 3 15	1 7 52 12 1	8 12 12 3	29° 0									
5 12 3	3 44 12	4	2 24 15	3		2 43 15	4 8 31 12 4	8 49 12 4	●									
4 12 5	4 23 12	5	3 1 15	5		3 19 15	5 9 8 12 4	9 25 12 3	1° 5									
1 12 4	4 59 12	3	3 36 15	4		4 53 15	2 9 43 12 2	10 0 12 1	2° 5									
6 12 1	5 33 12	0	4 10 15	1		4 28 15	0 10 18 11 11	10 36 11 9	3° 5									
1 11 11	6 9 11	10	4 46 14	10		5 3 14	9 10 54 11 7	11 13 11 5	4° 5									
8 11 8	6 46 11	6	5 22 14	7		5 41 14	5 11 33 11 2	11 52 11 0	5° 5									
4 11 4	7 24 11	1	6 0 14	2		6 21 13	11 — —	0 12 10 9	6° 5									
6 10 10	8 10 10	7	6 42 13	7		7 5 13	4 0 34 10 5	0 57 10 2	7° 5									
6 10 3	9 5 10	1	7 31 13	1		7 59 12	10 1 22 10 0	1 50 9 9	8° 5									
5 9 11	10 10 9	10	8 28 12	8		9 2 12	6 2 19 9 7	2 54 9 6	9° 5									
3 9 11	11 16 10	1	9 38 12	7		10 11 12	8 3 33 9 6	4 9 9 6	10° 5									
9 10 4	— —		10 43 12	11		11 15 13	2 4 43 9 7	5 17 9 10	11° 5									
12 10 7	0 52 10	11	11 46 13	6		— —	5 48 10 2	6 16 10 8	12° 5									
10 11 3	1 47 11	7	0 14 13	11		0 41 14	5 6 41 11 2	7 5 11 10	13° 5									
13 12 0	2 36 12	6	1 7 15	0		1 33 15	6 7 26 12 5	7 47 13 0	14° 5									
59 12 11	3 22 13	3	1 57 16	0		2 20 16	5 8 8 13 5	8 31 13 9	⊙									
45 13 7	4 8 13	10	2 43 16	9		3 5 17	0 8 53 13 11	9 15 14 1	16° 5									
31 14 0	4 55 13	11	3 27 17	1		3 50 17	1 9 39 14 1	10 3 14 0	17° 5									
19 13 10	5 43 13	9	4 13 17	0		4 37 16	10 10 27 13 10	10 52 13 7	18° 5									
7 13 7	6 32 13	4	5 2 16	8		5 27 16	5 11 17 13 3	11 43 12 10	19° 5									
56 13 0	7 20 12	7	5 52 16	0		6 16 15	7 — —	0 8 12 4	20° 5									
45 12 2	8 14 11	8	6 42 15	1		7 9 14	6 0 33 11 11	1 1 11 5	21° 5									
45 11 2	9 17 10	9	7 40 14	1		8 11 13	7 1 30 10 11	2 2 10 6	22° 5									
52 10 5	10 30 10	3	8 45 13	3		9 23 12	11 2 36 10 2	3 16 9 10	23° 5									
7 10 2	11 43 10	3	10 1 12	10		10 36 12	10 3 58 9 8	4 36 9 7	24° 5									
— —	0 18 10	4	11 11 12	11		11 45 13	1 5 13 9 7	5 47 9 9	25° 5									
51 10 6	1 20 10	8	— —			0 14 13	4 6 16 10 1	6 41 10 5	26° 5									
46 10 11	2 11 11	2	0 40 13	8		1 5 14	0 7 4 10 10	7 23 11 3	27° 5									
in Spring } 6ft. 8in.						8ft. 2in.						6ft. 7in.						
ing.																		

## Equation of Time at Noon.

S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
34	Sub.	9	4 56	Sub.	17	5 51	Sub.	25	6 12	Sub.
45		10	5 5		18	5 56		26	6 12	
56		11	5 13		19	6 0		27	6 12	
7		12	5 20		20	6 3		28	6 11	
18		13	5 28		21	6 6		29	6 9	
28		14	5 34		22	6 9		30	6 7	
38		15	5 40		23	6 10		31	6 4	
47		16	5 46		24	6 12				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 N SHIELDS add 6 m. | LEITH add 12 m. | THURSO add 14 m.

JULY, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	
F.	1	9m 54	9 44	8 10	10 12	8 11	9 7	22 9	9 32	23 1	3 40	17 10	4 11	18 2	
S.	2	10 46	10 38	9 0	11 3	9 0	9 57	23 6	10 19	23 9	4 40	18 6	5 6	18 13	
S.	3	11 37	11 27	9 1	11 50	9 2	10 41	23 11	11 3	24 1	5 31	19 1	5 55	19 3	
M.	4	12 26	—	—	0 11	9 3	11 23	24 3	11 43	24 5	6 15	19 6	6 34	19 7	
Tu.	5	1 13	0 32	9 3	0 52	9 4	—	—	0 3	24 6	6 54	19 8	7 11	19 8	
W.	6	1 58	1 10	9 4	1 28	9 4	0 20	24 6	0 38	24 6	7 28	19 7	7 45	19 6	
Th.	7	2 42	1 45	9 4	2 1	9 4	0 55	24 4	1 11	24 2	8 2	19 5	8 19	19 3	
F.	8	3 24	2 18	9 3	2 35	9 3	1 28	24 0	1 45	23 9	8 36	19 1	8 54	18 13	
S.	9	4 6	2 53	9 2	3 10	9 1	2 3	23 5	2 20	23 1	9 12	18 6	9 28	18 3	
S.	10	4 48	3 26	9 0	3 44	8 11	2 37	22 9	2 54	22 4	9 45	17 10	10 3	17 4	
M.	11	5 31	4 3	8 10	4 24	8 9	3 14	21 11	3 35	21 6	10 22	17 2	10 34	16 9	
Tu.	12	6 16	4 46	8 8	5 10	8 6	3 58	21 0	4 24	20 7	11 3	16 8	11 25	15 10	
W.	13	7 3	5 35	8 5	6 5	8 4	4 52	20 3	5 26	20 0	11 50	15 7	—	—	
Th.	14	7 54	6 38	8 3	7 11	8 2	6 3	20 1	6 40	20 3	0 20	15 7	0 53	15 7	
F.	15	8 49	7 46	8 3	8 22	8 5	7 16	20 8	7 50	21 2	1 32	15 9	2 11	16 2	
S.	16	9 47	8 55	8 7	9 28	8 9	8 24	21 9	8 53	22 6	2 48	16 9	3 23	17 6	
S.	17	10 46	9 58	9 0	10 27	9 2	9 21	23 3	9 47	24 1	3 56	18 3	4 27	19 4	
M.	18	11 46	10 54	9 4	11 20	9 6	10 11	24 9	10 35	25 5	4 57	19 9	5 24	20 3	
Tu.	19	morn.	11 46	9 8	—	—	10 59	26 0	11 24	26 7	5 51	21 0	6 16	21 6	
W.	20	0 45	0 12	9 10	0 36	10 0	11 48	27 0	—	—	6 39	21 11	7 2	22 3	
Th.	21	1 42	1 0	10 1	1 24	10 2	0 11	27 4	0 35	27 6	7 25	22 4	7 48	22 4	
F.	22	2 37	1 47	10 2	2 10	10 2	0 58	27 7	1 21	27 4	8 11	22 2	8 35	21 10	
S.	23	3 30	2 33	10 1	2 57	10 0	1 44	26 11	2 7	26 5	8 59	21 6	9 23	20 11	
S.	24	4 22	3 20	9 10	3 42	9 8	2 30	25 9	2 52	25 0	9 43	20 3	10 4	19 2	
M.	25	5 14	4 4	9 6	4 28	9 4	3 15	24 3	3 39	23 6	10 27	18 11	10 51	18 11	
Tu.	26	6 6	4 55	9 1	5 22	8 10	4 6	22 7	4 36	21 10	11 14	17 4	11 38	16 1	
W.	27	6 58	5 51	8 8	6 25	8 5	5 9	21 2	5 47	20 9	—	—	0 8	16 2	
Th.	28	7 50	7 1	8 3	7 39	8 3	6 29	20 6	7 9	20 6	0 42	15 10	1 23	15 3	
F.	29	8 42	8 18	8 4	8 54	8 5	7 46	20 9	8 23	21 1	2 7	15 11	2 47	16 1	
S.	30	9 33	9 27	8 6	9 57	8 8	8 52	21 7	9 20	22 1	3 22	16 8	3 54	17 1	
S.	31	10 22	10 24	8 9	10 48	8 10	9 45	22 7	10 7	23 1	4 24	17 8	4 50	18 1	
Half Mean Spring Range.			4ft. 10in.				13ft. 0in.				10ft. 6in.				
Phases of the Moon.							Moon's Declination at Noon.								
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'
New - - - -	4	0 24	Morning.				1	20	N. 3	9	0	N. 44	17	19	S. 54
First Quarter -	12	3 51	Morning.				2	20	17	10	3	S. 22	18	18	17
Full - - - -	19	6 36	Morning.				3	19	30	11	7	22	19	15	24
Last Quarter -	25	8 46	Afternoon.				4	17	49	12	11	9	20	11	28
							5	15	20	13	14	32	21	6	48
In Apogee - -	8	8 0	Morning.				6	12	14	14	17	20	22	1	47
In Perigee - -	20	2 0	Afternoon.				7	8	40	15	19	18	23	3	N. 15
							8	4	47	16	20	13	24	8	0

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, GREENOCK add 19 m. LIVERPOOL add 12 m. PEMBROKE add 20 m

JULY, 1864.

WESTON-SUPER-MARE.										HOLYHEAD.										KINGSTOWN.										C's Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.				D.					
H. M. F. L.	H. M. F. L.				H. M. F. L.	H. M. F. L.				H. M. F. L.	H. M. F. L.				H. M. F. L.	H. M. F. L.				H. M. F. L.	H. M. F. L.									
4 18 31 11	4 51 32 6	8 3 14 1	8 28 14 3	8 56 9 9	9 25 9 11	27.0																								
5 21 33 2	5 47 33 8	8 52 14 6	9 14 14 8	9 52 10 0	10 14 10 2	28.0																								
6 12 34 0	6 37 34 4	9 36 14 9	9 57 14 11	10 34 10 3	10 53 10 4	29.0																								
6 58 34 7	7 18 34 10	10 16 15 0	10 34 15 1	11 13 10 5	11 32 10 6																									
7 38 35 1	7 54 35 1	11 0 52 15 1	11 7 15 1	11 51 10 5	—	1.5																								
8 11 35 1	8 28 35 0	11 23 15 0	11 41 14 11	0 9 10 5	0 27 10 4	2.5																								
8 44 34 11	9 03 34 8	11 59 14 10	—	0 44 10 3	1 2 10 3	3.5																								
9 16 34 6	9 32 34 2	0 17 14 9	0 36 14 7	1 20 10 2	1 38 10 0	4.5																								
9 48 33 8	10 23 33 2	0 56 14 5	1 15 14 2	1 57 9 11	2 15 9 9	5.5																								
0 17 32 7	10 32 31 11	1 34 14 0	1 54 13 9	2 34 9 8	2 54 9 7	6.5																								
0 50 31 3	11 9 30 6	2 15 13 6	2 38 13 3	3 14 9 5	3 37 9 4	7.5																								
1 30 29 10	11 55 29 3	3 3 13 0	3 31 12 10	4 1 9 2	4 29 9 0																									
—	0 25 28 10	4 0 12 8	4 35 12 7	4 58 8 11	5 29 8 10	9.5																								
0 57 28 8	1 31 28 9	5 11 12 8	5 44 12 9	6 1 8 10	6 32 8 11	10.5																								
2 7 29 1	2 44 29 8	6 17 13 0	6 49 13 3	7 4 9 1	7 36 9 3	11.5																								
3 22 30 6	3 59 31 6	7 20 13 6	7 49 14 0	8 8 9 6	8 40 9 9	12.5																								
4 35 32 8	5 8 33 11	8 17 14 5	8 43 14 10	9 11 10 0	9 41 10 3	13.5																								
5 38 35 1	6 6 36 2	9 6 15 3	9 29 15 8	10 6 10 6	10 28 10 9	14.5																								
6 33 37 1	6 58 37 11	9 53 16 1	10 16 16 5	10 50 11 0	11 13 11 2																									
7 23 38 8	7 46 39 3	10 38 16 8	10 58 16 10	11 36 11 4	11 59 11 4	16.5																								
8 9 39 6	8 31 39 7	11 20 16 11	11 43 16 11	—	0 23 11 5	17.5																								
8 53 39 5	9 15 39 0	—	0 9 16 10	0 47 11 4	1 12 11 3	18.5																								
9 37 38 5	9 59 37 6	0 34 16 6	1 0 16 3	1 36 11 1	2 1 10 11	19.5																								
10 17 36 6	10 35 35 4	1 25 15 10	1 50 15 5	2 26 10 8	2 50 10 5	20.5																								
10 55 34 1	11 18 32 10	2 15 14 11	2 42 14 6	3 14 10 2	3 41 9 11																									
11 42 31 7	—	3 11 14 0	3 43 13 7	4 10 9 8	4 41 9 5	22.5																								
0 11 30 6	0 44 29 7	4 17 13 3	4 56 13 0	5 14 9 2	5 48 9 0	23.5																								
1 21 29 2	2 0 29 0	5 34 12 11	6 10 12 11	6 22 9 0	6 57 9 1	24.5																								
2 40 29 2	3 20 29 7	6 45 13 0	7 19 13 2	7 32 9 2	8 6 9 3	25.5																								
3 57 30 2	4 32 30 11	7 48 13 5	8 16 13 8	8 38 9 5	9 10 9 7	26.5																								
5 43 1 9	5 31 32 7	8 41 13 11	9 2 14 3	9 38 9 9	10 1 9 11	27.5																								
Mean Spring } 18 ft. 7 in.					8 ft. 0 in.					5 ft. 6 in.																				

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
3 34	Sub.	9	4 56	Sub.	17	5 51	Sub.	25	6 12	Sub.
3 45		10	5 5		18	5 56		26	6 12	
3 56		11	5 13		19	6 0		27	6 12	
4 7		12	5 20		20	6 3		28	6 11	
4 18		13	5 28		21	6 6		29	6 9	
4 28		14	5 34		22	6 9		30	6 7	
4 38		15	5 40		23	6 10		31	6 4	
4 47		16	5 46		24	6 12				

ns of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

JULY, 1864.

WEEK DAY.		MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.																	
				MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.														
				Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.													
F.	S.		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.													
1	2	9m54	8 37	8 7	9 2	8 9	5 47	6 9	6 12	6 10	3 8	9 6	3 31																				
2	3	10 46	9 27	8 11	9 50	9 0	6 38	6 11	7 2	7 0	3 54	9 11	4 16																				
3	4	11 37	10 12	9 0	10 32	9 1	7 25	7 0	7 47	7 1	4 38	10 3	5 0																				
4	5	12 26	10 52	9 1	11 11	9 1	8 6	7 2	8 24	7 3	5 20	10 6	5 40																				
5	6	1 13	11 30	9 1	11 45	9 1	8 42	7 3	8 56	7 2	6 0	10 7	6 15																				
6	7	1 58	—	—	0 2	9 1	9 13	7 1	9 29	7 0	6 32	10 5	6 50																				
7	8	2 42	0 20	9 0	0 38	9 0	9 45	6 11	10 1	6 10	7 7	10 2	7 24																				
8	9	3 24	0 56	9 0	1 14	8 11	10 17	6 9	10 35	6 7	7 41	9 10	7 58																				
9	10	4 6	1 34	8 11	1 54	8 10	10 53	6 6	11 13	6 4	8 16	9 6	8 35																				
10	11	4 48	2 15	8 9	2 36	8 8	11 37	6 2	—	—	8 55	9 1	9 17																				
11	12	5 31	2 57	8 6	3 20	8 5	0 2	6 0	0 32	5 10	9 43	8 9	10 10																				
12	1	6 16	3 45	8 4	4 11	8 3	1 2	5 8	1 35	5 7	10 40	8 5	11 10																				
13	2	7 3	4 39	8 2	5 10	8 1	2 11	5 7	2 47	5 7	11 42	8 4	—																				
14	3	7 54	5 42	8 1	6 14	8 1	3 30	5 9	3 50	5 11	0 15	8 4	0 48																				
15	4	8 49	6 48	8 1	7 22	8 2	4 19	6 2	4 46	6 4	1 21	8 7	1 55																				
16	5	9 47	7 54	8 4	8 22	8 6	5 11	6 6	5 36	6 8	2 27	9 0	2 54																				
17	6	10 46	8 50	8 9	9 17	9 0	6 1	6 11	6 27	7 1	3 21	9 9	3 45																				
18	7	11 46	9 42	9 2	10 6	9 4	6 53	7 4	7 18	7 6	4 10	7 4	4 31																				
19	8	morn.	10 29	9 6	10 52	9 7	7 43	7 9	8 6	7 11	4 56	11 3	5 21																				
20	9	0 45	11 14	9 8	11 36	9 9	8 28	8 1	8 48	8 2	5 45	11 9	6 6																				
21	10	1 42	11 58	9 9	—	—	9 10	8 2	9 32	8 1	6 28	11 10	6 52																				
22	11	2 37	0 22	9 9	0 47	9 9	9 54	7 11	10 16	7 9	7 17	11 7	7 41																				
23	12	3 30	1 12	9 8	1 38	9 7	10 40	7 7	11 4	7 5	8 4	11 0	8 27																				
24	1	4 22	2 5	9 5	2 31	9 3	11 29	7 1	12 0	6 9	8 51	10 4	9 16																				
25	2	5 14	2 57	9 1	3 24	8 10	—	—	0 33	6 5	9 46	9 7	10 19																				
26	3	6 6	3 53	8 8	4 23	8 6	1 11	6 2	1 49	6 0	10 52	9 0	11 27																				
27	4	6 58	4 56	8 4	5 30	8 3	2 29	5 11	3 7	5 11	—	—	0 3																				
28	5	7 50	6 4	8 2	6 41	8 1	3 41	6 0	4 14	6 1	0 39	8 6	1 15																				
29	6	8 42	7 18	8 1	7 53	8 2	4 44	6 2	5 12	6 3	1 51	8 7	2 26																				
30	7	9 33	8 22	8 3	8 49	8 5	5 36	6 5	6 0	6 6	2 54	8 11	3 20																				
31	8	10 22	9 15	8 8	9 37	8 10	6 24	6 8	6 47	6 9	3 44	9 6	4 4																				
Half Mean Spring } Range.				4ft. 9in.						3ft. 10in.						5ft. 7in.																	
Phases of the Moon.																						Moon's Declination at Noon.											
				D.	H.	M.					M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°												
New				—	—	4	0 24 Morning.					1	20 N.	3	9	0 N.44	17	19 S.54	25	1	1												
First Quarter				—	—	12	3 51 Morning.					2	20	17	10	3 S.22	18	18	17	26	1												
Full				—	—	19	6 36 Morning.					3	19	30	11	7 22	19	15	24	27	1												
Last Quarter				—	—	25	8 46 Afternoon.					4	17	49	12	11 9	20	11	28	28	1												
												5	15	20	13	14 32	21	6	48	29	2												
In Apogee				—	—	8	8 0 Morning.					6	12	14	14	17 20	22	1	47	30	1												
In Perigee				—	—	20	2 0 Afternoon.					7	8	40	15	19 18	23	3 N.15	31	1	1												
												8	4	47	16	20 13	24	8	0														

Times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required BELFAST subtract 2 m. LONDONDERRY add 4m. SLIGO BAY add 4 m

## AUGUST, 1864.

DOVER.						SHEERNESS.						LONDON.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		
10 14	16 9		10 36	17 1		—	—		0 5	14 9		1 13	17 0		1 36	17 3	28.5	
10 57	17 4		11 17	17 6		0 26	14 11		0 46	15 1		1 55	17 6		2 15	17 9	●	
11 36	17 8		11 54	17 10		1 6	15 3		1 23	15 5		2 34	18 0		2 52	18 3	0.9	
—	—		0 12	17 11		1 39	15 6		1 56	15 7		3 9	18 5		3 25	18 6	1.9	
0 28	18 0		0 44	18 0		2 11	15 7		2 26	15 7		3 40	18 7		3 56	18 8	2.9	
1 1	17 11		1 18	17 10		2 41	15 6		2 55	15 6		4 10	18 8		4 27	18 7	3.9	
1 35	17 9		1 51	17 7		3 10	15 5		3 25	15 3		4 42	18 6		4 58	18 4	4.9	
2 9	17 4		2 27	17 1		3 41	15 1		3 58	14 11		5 13	18 3		5 28	18 0	5.9	
2 45	16 9		3 4	16 5		4 16	14 8		4 33	14 5		5 46	17 10		6 5	17 7	6.9	
3 22	16 0		3 44	15 7		4 53	14 1		5 13	13 10		6 23	17 3		6 45	16 11	7.9	
4 9	15 2		4 34	14 9		5 37	13 6		6 5	13 3		7 7	16 7		7 34	16 4	8.9	
5 1	14 5		5 35	14 3		6 36	13 1		7 10	12 11		8 3	16 1		8 40	15 11	9.9	
6 11	14 4		6 49	14 8		7 52	13 0		8 34	13 1		9 21	15 10		9 59	15 9	10.9	
7 29	15 3		8 7	15 10		9 14	13 5		9 52	13 10		10 42	16 0		11 22	16 4	11.9	
8 39	16 6		9 9	17 3		10 28	14 3		10 58	14 9		11 57	16 9		—	—	12.9	
9 37	17 11		10 5	18 7		11 26	15 3		11 51	15 9		0 26	17 3		0 55	17 10	13.9	
10 32	19 2		10 57	19 8		—	—		0 16	16 2		1 21	18 4		1 46	18 11	○	
11 23	20 1		11 47	20 3		0 41	16 7		1 5	16 11		2 10	19 5		2 35	19 10	15.9	
—	—		0 12	20 5		1 27	17 2		1 50	17 3		2 58	20 2		3 19	20 5	16.9	
0 36	20 6		1 12	20 4		2 12	17 3		2 34	17 3		3 42	20 6		4 2	20 7	17.9	
1 25	20 1		1 49	19 8		2 55	17 2		3 16	16 11		4 23	20 6		4 48	20 3	18.9	
2 12	19 3		2 34	18 7		3 38	16 7		4 0	16 2		5 10	19 11		5 32	19 6	19.9	
2 56	17 11		3 18	17 3		4 22	15 9		4 44	15 2		5 54	19 9		6 17	18 6	20.9	
3 42	16 6		4 8	15 9		5 8	14 8		5 35	14 2		6 42	17 11		7 7	17 4	21.9	
4 34	15 0		5 3	14 6		6 4	13 8		6 37	13 3		7 34	16 9		8 5	16 3	22.9	
5 38	14 2		6 15	14 0		7 13	13 0		7 58	12 11		8 42	15 10		9 26	15 8	23.9	
6 54	14 2		7 34	14 5		8 38	12 11		9 19	13 11		10 6	15 6		10 45	15 7	24.9	
8 10	14 10		8 42	15 4		9 57	13 4		10 31	13 7		11 23	15 8		11 59	15 11	25.9	
9 8	15 9		9 33	16 3		11 1	13 11		11 27	14 3		—	—		0 28	16 4	26.9	
9 54	16 8		10 14	17 0		11 48	14 6		—	—		0 54	16 8		1 16	17 0	27.9	
10 33	17 4		10 50	17 8		0 7	14 10		0 25	15 1		1 36	17 5		1 53	17 9	28.9	
Mean Spring } Range.						8ft. 0in.						9ft. 7in.						

## Equation of Time at Noon.

M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
6 1	Sub.	9	5 12	Sub.	17	3 46	Sub.	25	1 47	Sub.
5 57		10	5 3		18	3 32		26	1 31	
5 52		11	4 54		19	3 19		27	1 14	
5 47		12	4 44		20	3 5		28	0 56	
5 41		13	4 33		21	2 50		29	0 38	
5 35		14	4 22		22	2 35		30	0 20	
5 28		15	4 11		23	2 19		31	0 2	
5 20		16	3 58		24	2 4				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, for  
DOVER subtract 5 m. SHEERNESS subtract 3 m. LONDON 0 m.



## AUGUST, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
			H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.	
M.	1	11 10	11 17	10 9		11 39	10 11		5 33	18 10		5 54	19 0		2 28	12 8		2 51	12 1				
Tu.	2	11 56	11 59	11 0		—	—		6 15	19 3		6 36	19 6		3 11	13 1		3 29	13 1				
W.	3	0 40	0 19	11 1		0 36	11 2		6 54	19 8		7 11	19 10		3 46	13 6		4 2	13 1				
Th.	4	1 22	0 52	11 2		1 8	11 3		7 27	20 0		7 44	20 0		4 18	13 9		4 34	13 1				
F.	5	2 4	1 25	11 2		1 41	11 2		8 02	20 1		8 14	20 1		4 49	13 10		5 4	13 1				
S.	6	2 46	1 55	11 1		2 11	11 0		8 29	20 0		8 45	19 10		5 19	13 8		5 35	13 1				
♄.	7	3 28	2 27	10 11		2 43	10 10		9 0	19 7		9 16	19 4		5 51	13 4		6 7	13 1				
M.	8	4 11	2 59	10 9		3 16	10 8		9 34	19 0		9 51	18 8		6 25	12 11		6 44	12 1				
Tu.	9	4 57	3 34	10 6		3 51	10 4		10 8	18 4		10 28	17 11		7 3	12 5		7 24	12 1				
W.	10	5 45	4 9	10 2		4 27	10 4		10 50	17 6		11 17	17 1		7 45	11 10		8 10	11 1				
Th.	11	6 37	4 51	9 11		5 17	9 9		11 48	16 8		—	—		8 37	11 3		9 8	11 1				
F.	12	7 31	5 45	9 8		6 17	9 7		0 21	16 4		0 54	16 2		9 41	10 11		10 22	10 1				
S.	13	8 29	6 59	9 8		7 42	9 9		1 31	16 2		2 9	16 3		11 1	10 11		11 39	11 1				
♄.	14	9 27	8 22	9 11		8 59	10 2		2 45	16 9		3 21	17 5		—	—		0 13	11 1				
M.	15	11 26	9 35	10 6		10 7	10 10		3 57	18 2		4 27	18 11		0 47	12 2		1 17	12 1				
Tu.	16	11 24	10 37	11 1		11 3	11 5		4 55	19 8		5 20	20 4		1 47	13 3		2 14	13 1				
W.	17	morn.	11 29	11 9		11 54	12 0		5 45	21 0		6 10	21 6		2 41	14 3		3 6	14 1				
Th.	18	0 21	—	—		0 18	12 2		6 35	22 0		6 58	22 5		3 28	15 1		3 50	15 1				
F.	19	1 17	0 40	12 3		1 2	12 4		7 21	22 7		7 44	22 9		4 12	15 8		4 34	15 1				
S.	20	2 12	1 25	12 4		1 48	12 3		8 7	22 9		8 29	22 7		4 56	15 9		5 18	15 1				
♄.	21	3 6	2 10	12 2		2 33	12 0		8 51	22 3		9 14	21 8		5 41	15 2		6 5	14 1				
M.	22	3 59	2 56	11 9		3 19	11 6		9 36	21 1		9 58	20 4		6 28	14 4		6 51	13 1				
Tu.	23	4 53	3 40	11 3		4 1	10 11		10 19	19 7		10 44	18 10		7 15	13 4		7 40	12 1				
W.	24	5 46	4 23	10 7		4 48	10 4		11 14	18 1		11 46	17 4		8 7	12 3		8 36	11 1				
Th.	25	6 39	5 16	10 0		5 46	9 10		—	—		0 22	16 8		9 8	11 3		9 45	10 1				
F.	26	7 30	6 21	9 8		7 5	9 7		0 58	16 3		1 35	16 0		10 26	10 9		11 5	10 8				
S.	27	8 20	7 47	9 7		8 27	9 8		2 13	15 11		2 49	16 2		11 43	10 10		—	—				
♄.	28	9 8	9 4	9 10		9 38	10 0		3 25	16 7		4 0	17 1		0 17	11 1		0 50	11 1				
M.	29	9 54	10 10	10 3		10 37	10 5		4 30	17 7		4 56	18 1		1 20	11 9		1 46	12 1				
Tu.	30	10 38	10 59	10 8		11 19	10 10		5 17	18 6		5 36	18 11		2 11	12 5		2 31	12 9				
W.	31	11 21	11 38	11 0		11 56	11 2		5 54	19 4		6 11	19 7		2 50	13 1		3 7	13 4				
Half Mean Spring Range.			5ft. 9in.						10ft. 5in.						7ft. 2in.								
Phases of the Moon.												Moon's Declination at Noon.											
D. H. M.												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
New - - - - 2 2 34 Afternoon.												1	16N. 4		9	13	8.18	17	8	57	25	19N.57	
First Quarter - 10 5 57 Afternoon.												2	13 10		10	16	14	18	3	59	26	19 43	
Full - - - - 17 1 36 Afternoon.												3	9 46		11	18	28	19	1N.11	27	18 32		
Last Quarter - 24 6 4 Morning.												4	6 0		12	19	47	20	6 11	28	16 33		
												5	2 1		13	20	1	21	10 42	29	13 51		
In Apogee - - 4 8 0 Afternoon.												6	28. 3		14	19	1	22	14 28	30	10 37		
In Perigee - - 17 10 0 Afternoon.												7	6 3		15	16	44	23	17 20	31	6 59		
In Apogee - - 31 12 0 Midnight.												8	9 51		16	13	18	24	19 10				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 HARWICH subtract 5 m.                      HULL add 1 m.                      SUNDERLAND add 5 m.

## AUGUST, 1864.

NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.			
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.						
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.					
H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.		H. M. F. L.	H. M. F. L.					
2 32 11 6	2 52 11 9	1 27 14 5	1 49 14 9	7 40 11 8	7 58 12 0	28.5	3 11 12 0	3 30 12 3	2 9 15 0	2 28 15 3	8 16 12 3	8 33 12 5	0	3 47 12 5	4 3 12 6	2 45 15 5	3 0 15 7	8 48 12 6	9 4 12 7	0.9	
4 19 12 7	4 36 12 7	3 15 15 8	3 31 15 7	9 20 12 7	9 36 12 7	1.9	4 51 12 7	5 7 12 6	3 47 15 7	4 1 15 6	9 51 12 6	10 7 12 4	2.9	5 23 12 5	5 39 12 3	4 17 15 5	4 34 15 3	10 24 12 3	10 40 12 0	3.9	
5 55 12 2	6 11 12 0	4 50 15 1	5 6 14 11	10 56 11 10	11 15 11 7	4.9	6 29 11 10	6 47 11 7	5 23 14 9	5 43 14 6	11 35 11 3	11 54 11 0	5.9	7 5 11 4	7 26 11 1	6 1 14 2	6 22 13 10	—	0 14 10 8	6.9	
7 49 10 9	8 15 10 4	6 44 13 6	7 9 13 2	0 36 10 4	1 1 10 0	—	8 44 10 0	9 17 9 10	7 40 12 10	8 11 12 7	1 30 9 9	2 2 9 6	8.9	9 53 9 9	10 34 9 10	8 45 12 5	9 28 12 5	2 37 9 4	3 22 9 4	9.9	
11 13 10 0	11 52 10 3	10 8 12 7	10 45 12 10	4 6 9 5	4 45 9 7	10.9	—	0 27 10 8	11 20 13 3	11 54 13 9	5 22 9 11	5 55 10 5	11.9	0 59 11 1	1 28 11 6	—	0 22 14 3	6 24 11 1	6 47 11 9	12.9	
1 54 12 0	2 19 12 7	0 48 14 11	1 14 15 7	7 9 12 6	7 31 13 2	13.9	2 43 13 2	3 5 13 7	1 39 16 3	2 3 16 9	7 53 13 9	8 15 14 3	0	3 28 14 0	3 50 14 4	2 26 17 3	2 48 17 7	8 36 14 6	8 57 14 8	15.9	
4 13 14 6	4 36 14 6	3 9 17 8	3 31 17 9	9 20 14 8	9 43 14 7	16.9	4 59 14 5	5 22 14 3	3 53 17 7	4 16 17 5	10 6 14 5	10 30 14 1	17.9	5 45 14 0	6 9 13 8	4 40 17 1	5 3 16 9	10 54 13 8	11 18 13 2	18.9	
6 32 13 3	6 54 12 9	5 26 16 4	5 49 15 9	11 42 12 7	—	19.9	7 17 12 3	7 43 11 9	6 13 15 2	6 39 14 7	0 6 12 0	0 31 11 5	20.9	8 12 11 1	8 43 10 6	7 6 13 11	7 38 13 4	0 58 10 10	1 28 10 3	—	
9 18 10 1	9 57 9 10	8 12 12 10	8 49 12 6	2 3 9 9	2 41 9 5	22.9	10 38 9 8	11 17 9 9	9 33 12 4	10 12 12 3	3 28 9 3	4 10 9 1	23.9	11 56 9 10	—	10 49 12 4	11 24 12 7	4 50 9 1	5 26 9 2	24.9	
0 31 10 0	1 2 10 3	11 57 12 10	—	5 58 9 6	6 27 10 0	25.9	1 31 10 7	1 55 10 11	0 25 13 3	0 49 13 8	6 49 10 5	7 9 10 11	26.9	2 16 11 3	2 35 11 8	1 10 14 1	1 30 14 7	7 25 11 5	7 40 11 10	27.9	
2 52 12 0	3 8 12 3	1 48 14 11	2 5 15 3	7 55 12 3	8 9 12 6	28.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mean Spring } 6ft. 8in. Range.						8ft. 2in.						6ft. 7in.									

Mean Spring } 6ft. 8in.  
Range.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
6 1	Sub.	9	5 12	Sub.	17	3 46	Sub.	25	1 47	Sub.
5 57		10	5 3		18	3 32		26	1 31	
5 52		11	4 54		19	3 19		27	1 14	
5 47		12	4 44		20	3 5		28	0 56	
5 41		13	4 33		21	2 50		29	0 38	
5 35		14	4 22		22	2 35		30	0 20	
5 28		15	4 11		23	2 19		31	0 2	
5 20		16	3 58		24	2 4				

s of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 18 m.      THURSO add 14 m.



## AUGUST, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
M.	1	11 10	11 11	8 11	11 33	9 0	10 27	23 5	10 47	23 9	5 14	18 7	5 37							
Tu.	2	11 56	11 54	9 2	—	—	11 7	24 1	11 25	24 5	5 59	19 3	6 17							
W.	3	0 40	0 13	9 3	0 31	9 4	11 42	24 8	11 59	24 10	6 33	19 10	6 49							
Th.	4	1 22	0 48	9 5	1 5	9 5	—	—	0 15	24 11	7 6	20 1	7 22							
F.	5	2 4	1 21	9 6	1 36	9 6	0 31	25 0	0 47	25 0	7 36	20 1	7 51							
S.	6	2 46	1 51	9 6	2 7	9 6	1 22	24 11	1 17	24 8	8 7	19 10	8 23							
♄.	7	3 28	2 22	9 5	2 37	9 4	1 33	24 4	1 47	24 0	8 39	19 4	8 56							
M.	8	4 11	2 54	9 3	3 11	9 2	2 42	23 8	2 21	23 3	9 14	18 8	9 30							
Tu.	9	4 57	3 28	9 1	3 46	8 11	2 38	22 9	2 56	22 3	9 46	17 10	10 4							
W.	10	5 45	4 4	8 10	4 27	8 8	3 16	21 9	3 38	21 2	10 24	16 10	10 47							
Th.	11	6 37	4 52	8 7	5 20	8 5	4 52	20 7	4 36	20 2	11 10	15 10	11 36							
F.	12	7 31	5 51	8 3	6 29	8 2	5 10	19 10	5 52	19 10	—	—	0 10							
S.	13	8 29	7 8	8 2	7 48	8 3	6 37	20 1	7 18	20 7	0 49	15 5	1 34							
♄.	14	9 27	8 27	8 6	9 4	8 9	7 55	21 3	8 31	22 2	2 18	16 4	2 58							
M.	15	10 26	9 37	8 11	10 7	9 2	9 12	23 2	9 27	24 1	3 33	18 1	4 5							
Tu.	16	11 24	10 34	9 5	11 2	9 8	9 52	25 1	10 17	26 0	4 35	19 11	5 5							
W.	17	morn.	11 29	9 10	11 54	10 0	10 42	26 8	11 6	27 4	5 33	21 6	5 58							
Th.	18	0 21	—	—	0 18	10 2	11 30	27 11	11 53	28 3	6 21	22 8	6 44							
F.	19	1 17	0 41	10 4	1 5	10 5	—	—	0 16	28 5	7 6	23 2	7 29							
S.	20	2 12	1 28	10 5	1 51	10 5	0 39	28 5	1 12	28 3	7 51	23 0	8 13							
♄.	21	3 6	2 13	10 4	2 35	10 2	1 23	27 9	1 45	27 0	8 36	22 0	8 59							
M.	22	3 59	2 57	10 0	3 17	9 9	2 7	26 3	2 28	25 4	9 20	20 7	9 39							
Tu.	23	4 53	3 37	9 6	4 0	9 3	2 49	24 5	3 11	23 6	10 0	18 11	10 23							
W.	24	5 46	4 25	9 0	4 51	8 9	3 36	22 6	4 42	21 5	10 46	17 1	11 10							
Th.	25	6 39	5 21	8 6	5 54	8 4	4 36	20 6	5 13	20 0	11 39	15 6	—							
F.	26	7 30	6 33	8 2	7 13	8 0	5 58	19 8	6 42	19 7	0 15	15 2	0 55							
S.	27	8 20	7 53	8 1	8 32	8 2	7 23	19 10	8 0	20 2	1 40	15 1	2 23							
♄.	28	9 8	9 7	8 4	9 40	8 6	8 34	20 9	9 4	21 5	3 1	15 11	3 35							
M.	29	9 54	10 6	8 8	10 30	8 9	9 29	22 0	9 50	22 8	4 4	17 2	4 30							
Tu.	30	10 38	10 51	8 11	11 11	9 0	10 9	23 3	10 27	23 9	4 53	18 4	5 14							
W.	31	11 21	11 30	9 2	11 47	9 3	10 44	24 2	11 0	24 6	5 34	19 3	5 52							
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.					
Phases of the Moon.										Moon's Declination at Noon.										
D H. M.										M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°
New - - - - - 2 2 34 Afternoon.										1	16	N. 4	9	13	S. 18	17	8	S. 57	25	16
First Quarter - 10 5 57 Afternoon.										2	13	10	10	16	14	18	3	59	26	16
Full - - - - - 17 1 36 Afternoon.										3	9	46	11	18	28	19	1	N. 11	27	16
Last Quarter - 24 6 4 Morning.										4	6	0	12	19	47	20	6	11	28	16
										5	2	1	13	20	1	21	10	42	29	1
In Apogee - - 4 8 0 Afternoon.										6	2	S. 3	14	19	1	22	14	28	30	1
In Perigee - - 17 10 0 Afternoon.										7	6	3	15	16	44	23	17	20	31	
In Apogee - - 31 12 0 Midnight.										8	9	51	16	13	18	24	19	10		

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

AUGUST, 1864.

STON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age at Moon.												
DENEING.				AFTERNOON.				MORNING.					AFTERNOON.				MORNING.				AFTERNOON.			
e.	Height			Time.	Height.			Time.	Height.				Time.	Height.			Time.	Height.			Time.	Height.		
H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.	
55	33	3		6	18	33	10	9	22	14	6	9	42	14	8	10	21	10	0	10	39	10	2	28.5
11	34	5		6	59	34	9	10	1	14	11	10	18	15	1	10	58	10	4	11	15	10	6	●
17	35	2		7	34	35	7	10	33	15	2	10	47	15	3	11	31	10	7	11	47	10	7	0.9
50	35	9		8	5	35	10	11	2	15	4	11	17	15	4	—	—	—	0	4	10	7	1	9
10	35	10		8	34	35	9	11	32	15	4	13	48	15	3	0	20	10	7	0	35	10	6	2.9
19	35	7		9	4	35	4	—	—	—	—	0	5	15	2	0	51	10	6	1	8	10	5	3.9
18	35	0		9	33	34	6	0	21	15	0	0	38	14	9	1	24	10	3	1	40	10	2	4.9
19	33	11		10		33	3	0	57	14	7	1	16	14	4	1	58	10	0	2	16	9	10	5.9
18	32	6		10	33	31	8	1	35	14	0	1	56	13	9	2	35	9	9	2	55	9	7	6.9
51	30	9		11	14	29	11	2	17	13	5	2	42	13	1	3	16	9	4	3	40	9	2	7
10	29	2		—	—	—	3	11	12	10	3	43	12	7	4	10	9	0	4	41	8	10	8	8.9
10	28	7		0	48	28	4	4	18	12	5	5	1	12	6	5	14	8	9	5	52	8	9	9.9
18	28	6		2	9	29	0	5	41	12	8	6	19	12	11	6	29	8	10	7	6	9	11	10.9
50	29	11		3	32	31	1	6	54	13	4	7	27	13	9	7	42	9	4	8	17	9	7	11.9
10	32	5		4	45	33	11	7	57	14	4	8	24	14	11	8	49	9	11	9	20	10	3	12.9
16	35	6		5	46	36	11	8	48	15	6	9	12	16	0	9	47	10	7	10	12	10	11	13.9
14	38	1		6	40	39	1	9	36	16	6	10	0	16	11	10	34	11	2	10	56	11	5	0
4	39	10		7	28	40	6	10	21	17	2	10	41	17	4	11	18	11	8	11	41	11	9	15.9
51	40	9		8	13	40	9	11	2	17	5	11	24	17	5	—	—	—	0	4	11	9	10	16.9
14	40	8		8	55	40	0	11	47	17	4	—	—	—	0	27	11	8	0	50	11	7	17.9	
16	39	3		9	36	38	3	0	11	17	0	0	35	16	7	1	14	11	5	1	38	11	2	18.9
55	37	0		10	12	35	7	1	0	16	2	1	24	15	7	2	1	10	10	2	24	10	7	19.9
10	34	2		10	50	32	8	1	47	15	0	2	12	14	6	2	47	10	3	3	11	9	11	20.9
13	31	1		11	41	29	9	2	39	13	11	3	9	13	4	3	38	9	7	4	8	9	3	0
—	—	—		0	14	28	9	3	44	12	10	4	22	12	6	4	42	9	0	5	18	8	10	22.9
52	28	1		1	33	27	9	5	6	12	4	5	45	12	4	5	56	8	8	6	33	8	9	23.9
15	27	11		2	55	28	3	6	23	12	5	6	58	12	7	7	10	8	10	7	45	8	11	24.9
15	29	0		4	12	30	0	7	30	12	11	8	0	13	3	8	20	9	2	8	52	9	4	25.9
13	30	11		5	11	31	11	8	25	13	8	8	46	14	0	9	19	9	6	9	44	9	9	26.9
14	32	11		5	55	33	9	9	4	14	4	9	21	14	8	10	4	10	0	10	21	10	2	27.9
15	34	5		6	33	34	11	9	38	14	11	9	54	15	2	10	36	10	4	10	51	10	6	28.9
Spring }				18 ft. 7 in.				8 ft. 0 in.				5 ft. 6 in.												

## Equation of Time at Noon.

S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
1	Sub.	9	5 12	Sub.	17	3 46	Sub.	25	1 47	Sub.
57		10	5 3		18	3 32		26	1 31	
52		11	4 54		19	3 19		27	1 14	
47		12	4 44		20	3 5		28	0 56	
41		13	4 33		21	2 50		29	0 38	
35		14	4 22		22	2 35		30	0 20	
28		15	4 11		23	2 19		31	0 2	
20		16	3 58		24	2 4				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time

AUGUST, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.								LONDON DERRY.								SLIGO BAY.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.			
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.						
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.
M.	1	11 10	9 58	8 11	10 18	9 0	7 10	6 11	7 31	7 0	4 24	10 0	4													
Tu.	2	11 56	10 37	9 1	10 54	9 2	7 51	7 1	8 8	7 3	5 4	10 5	5													
W.	3	12 40	11 10	9 2	11 25	9 2	8 23	7 4	8 38	7 4	5 39	10 8	5													
Th.	4	1 22	11 40	9 2	11 55	9 2	8 52	7 4	9 7	7 4	6 10	10 9	6													
F.	5	2 4	—	—	0 10	9 2	9 21	7 3	9 35	7 2	6 40	10 8	6													
S.	6	2 46	0 27	9 2	0 44	9 2	9 50	7 1	10 5	6 11	7 13	10 5	7													
Sh.	7	3 28	1 0	9 1	1 16	9 0	10 19	6 10	10 37	6 8	7 43	10 0	8													
M.	8	4 11	1 36	8 11	1 56	8 10	10 55	6 6	11 15	6 4	8 18	9 6	8													
Tu.	9	4 57	2 16	8 9	2 38	8 8	11 40	6 2	—	—	8 57	9 1	9													
W.	10	5 45	3 0	8 6	3 24	8 4	0 6	5 11	0 38	5 8	9 48	8 7	10													
Th.	11	6 37	3 52	8 3	4 23	8 2	1 13	5 7	1 51	5 6	10 52	8 3	11													
F.	12	7 31	4 55	8 1	5 33	8 0	2 30	5 6	3 11	5 8	—	—	0													
S.	13	8 29	6 11	8 0	6 50	8 1	3 48	5 10	4 22	6 1	0 45	8 4	1													
Sh.	14	9 27	7 27	8 2	8 2	8 5	4 51	6 4	5 18	6 7	2 0	8 10	2													
M.	15	10 26	8 31	8 8	8 58	9 0	5 43	6 10	6 8	7 2	3 2	9 8	3													
Tu.	16	11 24	9 23	9 3	9 48	9 6	6 34	7 5	7 0	7 9	3 50	10 8	4													
W.	17	morn.	10 12	9 8	10 35	9 10	7 26	8 0	7 50	8 2	4 39	11 6	5													
Th.	18	0 21	10 57	9 11	11 19	9 11	8 11	8 5	8 32	8 6	5 27	12 1	5													
F.	19	1 17	11 40	9 11	—	—	8 53	8 6	9 14	8 5	6 10	12 3	6													
S.	20	2 12	0 2	9 11	0 26	9 11	9 35	8 3	9 56	8 1	6 56	12 1	7													
Sh.	21	3 6	0 50	9 10	1 14	9 9	10 17	7 10	10 39	7 7	7 41	11 4	8													
M.	22	3 59	1 38	9 7	2 2	9 4	11 2	7 3	11 27	6 11	8 25	10 6	8													
Tu.	23	4 53	2 27	9 1	2 54	8 10	11 58	6 6	—	—	9 14	9 7	9													
W.	24	5 46	3 21	8 8	3 51	8 5	0 33	6 1	1 11	5 10	10 17	8 9	10													
Th.	25	6 39	4 23	8 3	4 59	8 1	1 53	5 8	2 34	5 7	11 31	8 3	—													
F.	26	7 30	5 37	8 0	6 15	7 11	3 15	5 7	3 51	5 9	0 10	8 2	0													
S.	27	8 20	6 55	7 11	7 32	7 11	4 25	5 11	4 55	6 0	1 28	8 2	2													
Sh.	28	9 8	8 5	8 1	8 34	8 3	5 21	6 2	5 46	6 4	2 37	8 7	3													
M.	29	9 54	8 58	8 6	9 20	8 8	6 9	6 6	6 30	6 8	3 29	9 2	3													
Tu.	30	10 38	9 39	8 10	9 57	9 0	6 50	6 10	7 9	7 0	4 6	9 10	4													
W.	31	11 21	10 14	9 1	10 30	9 2	7 27	7 1	7 44	7 3	4 40	10 4	4													
Half Mean Spring Range.			4 ft. 9 in.				3 ft. 10 in.				5 ft. 7 in.															
Phases of the Moon.												Moon's Declination at Noon.														
D. H. M.												M.D. ° ' "														
New	—	—	2	2	34	Afternoon.						1	16	N. 4	9	13	8	18	17	8	s. 57	25				
First Quarter	10	5	57	Afternoon.						2	13	10	10	16	14	18	3	59	26							
Full	—	—	17	1	36	Afternoon.						3	9	46	11	18	28	19	1	N. 11	27					
Last Quarter	24	6	4	Morning.						4	6	0	12	19	47	20	6	11	28							
In Apogee	—	—	—	—						5	2	1	13	20	1	21	10	42	29							
In Perigee	—	—	4	8	Afternoon.						6	2	8. 3	14	19	1	22	14	28	30						
In Apogee	—	—	17	10	Afternoon.						7	6	3	15	16	44	23	17	20	31						
In Apogee	—	—	31	12	Midnight.						8	9	51	16	13	18	24	19	10							

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 2 m. | LONDON DERRY add 4 m. | SLIGO BAY add 9 m.

[illegible]

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
6 1		9	5 12		17	3 46		25	1 47	
5 57		10	5 3		18	3 32		26	1 31	
5 52		11	4 54		19	3 19		27	1 14	
5 47		12	4 44		20	3 5		28	0 56	
5 41		13	4 33		21	2 50		29	0 38	
5 35		14	4 22		22	2 35		30	0 20	
5 28		15	4 11		23	2 19		31	0 2	
5 20		16	3 58		24	2 4				

es of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.

## SEPTEMBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.								DEVONPORT.								PORTSMOUTH.								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
			H. M.	Time.	Height.		H. M.	Time.	Height.		H. M.	Time.	Height.		H. M.	Time.	Height.		H. M.	Time.	Height.		H. M.	Time.	Height.		
Th.	1	0 23	3 41	18 2	3 56	18 4	5 36	14 6	5 52	15 2	11 37	12 2	11 52	12 1	11 52	12 1	11 52	12 1	11 52	12 1	11 52	12 1	11 52	12 1	11 52	12 1	
F.	2	0 45	4 12	18 6	4 26	18 7	6 8	14 9	6 24	15 3	—	—	0 8	12 2	0 8	12 2	0 8	12 2	0 8	12 2	0 8	12 2	0 8	12 2	0 8	12 2	
S.	3	1 27	4 42	18 7	4 57	18 7	6 39	14 11	6 54	15 2	0 23	12 5	0 40	12 5	0 40	12 5	0 40	12 5	0 40	12 5	0 40	12 5	0 40	12 5	0 40	12 5	
S.	4	2 10	5 13	18 5	5 27	18 3	7 7	14 9	7 20	14 10	0 57	12 4	1 12	12 4	1 12	12 4	1 12	12 4	1 12	12 4	1 12	12 4	1 12	12 4	1 12	12 4	
M.	5	2 55	5 41	18 0	5 57	17 9	7 34	14 6	7 48	14 4	1 27	12 3	1 42	12 3	1 42	12 3	1 42	12 3	1 42	12 3	1 42	12 3	1 42	12 3	1 42	12 3	
Tu.	6	3 42	6 14	17 5	6 32	16 10	8 4	14 1	8 21	13 10	1 57	12 0	2 14	11 1	2 14	11 1	2 14	11 1	2 14	11 1	2 14	11 1	2 14	11 1	2 14	11 1	
W.	7	4 31	6 49	16 4	7 11	15 8	8 37	13 7	8 54	13 3	2 32	11 7	2 50	11 1	2 50	11 1	2 50	11 1	2 50	11 1	2 50	11 1	2 50	11 1	2 50	11 1	
Th.	8	5 23	7 34	15 1	7 57	14 6	9 14	13 1	9 37	12 7	3 11	11 2	3 32	10 1	3 32	10 1	3 32	10 1	3 32	10 1	3 32	10 1	3 32	10 1	3 32	10 1	
F.	9	6 17	8 27	14 0	9 1	13 7	10 1	12 8	10 31	12 1	3 55	10 7	4 24	10 1	4 24	10 1	4 24	10 1	4 24	10 1	4 24	10 1	4 24	10 1	4 24	10 1	
S.	10	7 13	9 40	13 6	10 24	13 8	11 3	12 4	11 43	11 10	4 56	10 1	5 33	9 1	5 33	9 1	5 33	9 1	5 33	9 1	5 33	9 1	5 33	9 1	5 33	9 1	
S.	11	8 10	11 11	14 0	11 54	14 7	—	—	0 29	12 6	6 15	9 11	7 0	10 1	7 0	10 1	7 0	10 1	7 0	10 1	7 0	10 1	7 0	10 1	7 0	10 1	
M.	12	9 7	—	—	0 31	15 4	1 14	12 4	1 59	13 3	7 41	10 6	8 21	11 1	8 21	11 1	8 21	11 1	8 21	11 1	8 21	11 1	8 21	11 1	8 21	11 1	
Tu.	13	10 3	1 6	16 4	1 36	17 4	2 37	13 4	3 14	14 6	8 57	11 6	9 28	12 1	9 28	12 1	9 28	12 1	9 28	12 1	9 28	12 1	9 28	12 1	9 28	12 1	
W.	14	10 59	2 1	18 4	2 24	19 3	3 45	14 5	4 14	15 6	9 56	12 5	10 20	12 1	10 20	12 1	10 20	12 1	10 20	12 1	10 20	12 1	10 20	12 1	10 20	12 1	
Th.	15	11 55	2 46	20 1	3 9	20 9	4 40	15 4	5 5	16 4	10 43	13 2	11 5	13 1	11 5	13 1	11 5	13 1	11 5	13 1	11 5	13 1	11 5	13 1	11 5	13 1	
F.	16	morn.	3 31	21 2	3 54	21 4	5 29	16 2	5 54	16 10	11 27	13 8	11 50	13 1	11 50	13 1	11 50	13 1	11 50	13 1	11 50	13 1	11 50	13 1	11 50	13 1	
S.	17	0 50	4 17	21 5	4 39	21 4	6 18	16 7	6 41	16 11	—	—	0 14	13 1	0 14	13 1	0 14	13 1	0 14	13 1	0 14	13 1	0 14	13 1	0 14	13 1	
S.	18	1 46	5 02	21 1	5 22	20 7	7 1	16 6	7 22	16 5	0 38	13 9	1 13	13 1	1 13	13 1	1 13	13 1	1 13	13 1	1 13	13 1	1 13	13 1	1 13	13 1	
M.	19	2 41	5 43	20 0	6 3	19 4	7 42	16 1	8 3	15 9	1 23	13 4	1 44	13 1	1 44	13 1	1 44	13 1	1 44	13 1	1 44	13 1	1 44	13 1	1 44	13 1	
Tu.	20	3 37	6 24	18 6	6 46	17 7	8 22	15 4	8 40	14 10	2 4	12 9	2 25	12 5	2 25	12 5	2 25	12 5	2 25	12 5	2 25	12 5	2 25	12 5	2 25	12 5	
W.	21	4 31	7 10	16 7	7 35	15 7	8 59	14 5	9 20	13 8	2 46	12 0	3 9	11 7	3 9	11 7	3 9	11 7	3 9	11 7	3 9	11 7	3 9	11 7	3 9	11 7	
Th.	22	5 24	8 1	14 9	8 29	13 11	9 42	13 5	10 4	12 7	3 33	11 2	3 58	10 9	3 58	10 9	3 58	10 9	3 58	10 9	3 58	10 9	3 58	10 9	3 58	10 9	
F.	23	6 16	9 0	13 4	9 42	13 0	10 32	12 6	11 2	11 8	4 24	10 3	4 55	9 1	4 55	9 1	4 55	9 1	4 55	9 1	4 55	9 1	4 55	9 1	4 55	9 1	
S.	24	7 4	10 26	12 11	11 9	12 11	11 41	12 0	—	—	5 35	9 8	6 16	9 6	6 16	9 6	6 16	9 6	6 16	9 6	6 16	9 6	6 16	9 6	6 16	9 6	
S.	25	7 51	11 49	13 3	—	—	0 23	11 6	1 5	12 3	6 58	9 7	7 36	9 10	7 36	9 10	7 36	9 10	7 36	9 10	7 36	9 10	7 36	9 10	7 36	9 10	
M.	26	8 36	0 25	13 8	0 56	14 3	1 45	11 10	2 20	12 10	8 13	10 1	8 47	10 3	8 47	10 3	8 47	10 3	8 47	10 3	8 47	10 3	8 47	10 3	8 47	10 3	
Tu.	27	9 19	1 23	14 11	1 45	15 6	2 51	12 7	3 21	13 7	9 15	10 9	9 37	11 1	9 37	11 1	9 37	11 1	9 37	11 1	9 37	11 1	9 37	11 1	9 37	11 1	
W.	28	10 2	2 4	16 2	2 22	16 9	3 44	13 4	4 6	14 3	9 59	11 4	10 17	11 7	10 17	11 7	10 17	11 7	10 17	11 7	10 17	11 7	10 17	11 7	10 17	11 7	
Th.	29	10 44	2 38	17 3	2 54	17 9	4 27	14 0	4 47	14 9	10 34	11 10	10 50	12 0	10 50	12 0	10 50	12 0	10 50	12 0	10 50	12 0	10 50	12 0	10 50	12 0	
F.	30	11 26	3 10	18 2	3 26	18 5	5 5	14 7	5 21	15 2	11 6	12 2	11 22	12 4	11 22	12 4	11 22	12 4	11 22	12 4	11 22	12 4	11 22	12 4	11 22	12 4	
Half Mean Spring Range.			9ft. 6in.				7ft. 9in.				6ft. 4in.																
Phases of the Moon.												Moon's Declination at Noon.															
D. H. M.												M.D. ° ' "															
New - - - - - 1 6 8 Morning.												1 3 N. 5 9 19 S. 50 17 8 N. 45 25 14 N. 27															
First Quarter - - 9 5 50 Morning.												2 08. 56 10 19 19 18 12 56 26 11 21															
Full - - - - - 15 9 9 Afternoon.												3 4 56 11 17 36 19 16 13 27 7 51															
Last Quarter - - 22 6 54 Afternoon.												4 8 46 12 14 45 20 18 28 28 4 1															
New - - - - - 30 10 43 Afternoon.												5 12 17 13 10 54 21 19 36 29 0 4															
In Perigee - - 15 8 0 Morning.												6 15 19 14 6 16 22 19 40 30 38. 51															
In Apogee - - 28 5 0 Morning.												7 17 42 15 1 12 23 18 44															
												8 19 16 16 3 N. 55 24 16 57															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4 m.

## SEPTEMBER, 1864.

DOVER.						SHEERNESS.						LONDON.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		
I 7 17 10			I 24 18 0		0 42 15 4	0 59 15 6	2 10 18 0		2 26 18 3			2 10 18 0			2 26 18 3			●
II 41 18 2			II 57 18 3		I 14 15 8	I 28 15 9	2 44 18 6		2 59 18 8			2 44 18 6			2 59 18 8			I. 2
— — —			0 14 18 3		I 44 15 10	I 58 15 10	3 13 18 9		3 28 18 11			3 13 18 9			3 28 18 11			2. 2
0 31 18 4			0 48 18 3		2 13 15 10	2 28 15 9	3 43 18 11		3 57 18 11			3 43 18 11			3 57 18 11			3. 2
I 4 18 2			I 20 18 0		2 43 15 8	2 57 15 7	4 14 18 10		4 28 18 9			4 14 18 10			4 28 18 9			4. 2
I 37 17 9			I 54 17 6		3 11 15 5	3 26 15 3	4 43 18 7		4 59 18 5			4 43 18 7			4 59 18 5			5. 2
2 13 17 2			2 32 16 9		3 43 15 0	4 2 14 9	5 15 18 2		5 32 17 10			5 15 18 2			5 32 17 10			6. 2
2 52 16 4			3 13 15 11		4 20 14 5	4 42 14 1	5 52 17 7		6 12 17 2			5 52 17 7			6 12 17 2			7. 2
3 36 15 5			4 4 14 11		5 4 13 9	5 30 13 6	6 35 16 10		7 1 16 6			6 35 16 10			7 1 16 6			8. 2
4 34 14 6			5 8 14 3		6 2 13 2	6 39 12 11	7 31 16 2		8 6 15 11			7 31 16 2			8 6 15 11			9. 2
5 45 14 4			6 26 14 8		7 21 12 11	8 6 13 1	8 49 15 10		9 32 15 10			8 49 15 10			9 32 15 10			10. 2
7 7 15 2			7 46 15 11		8 51 13 5	9 31 13 10	10 16 16 0		10 58 16 4			10 16 16 0			10 58 16 4			11. 2
8 21 16 8			8 51 17 5		10 8 14 4	10 40 14 10	11 35 16 9		— — —			11 35 16 9			— — —			12. 2
9 19 18 2			9 44 18 10		11 10 15 5	11 34 15 10	0 6 17 4		0 35 17 11			0 6 17 4			0 35 17 11			13. 2
10 8 19 5			10 33 19 11		11 57 16 4	— — —	1 3 18 6		1 27 19 1			1 3 18 6			1 27 19 1			14. 2
10 58 20 4			11 23 20 6		0 19 16 9	0 42 17 1	1 48 19 7		2 11 20 0			1 48 19 7			2 11 20 0			15. 2
11 47 20 7			— — —		1 4 17 4	1 26 17 5	2 34 20 4		2 56 20 7			2 34 20 4			2 56 20 7			16. 2
0 11 20 6			0 35 20 4		1 48 17 5	2 10 17 4	3 19 20 8		3 41 20 7			3 19 20 8			3 41 20 7			17. 2
0 59 20 0			1 22 19 7		2 32 17 2	2 52 16 11	4 22 20 5		4 23 20 2			4 22 20 5			4 23 20 2			18. 2
1 44 19 1			2 6 18 6		3 13 16 6	3 33 16 1	4 43 19 10		5 4 19 5			4 43 19 10			5 4 19 5			19. 2
2 28 17 10			2 51 17 0		3 54 15 8	4 16 15 2	5 25 18 11		5 46 18 4			5 25 18 11			5 46 18 4			20. 2
3 14 16 3			3 39 15 7		4 40 14 7	5 5 14 1	6 10 17 9		6 35 17 2			6 10 17 9			6 35 17 2			21. 2
4 4 14 11			4 32 14 3		5 34 13 7	6 3 13 2	7 1 16 8		7 33 16 2			7 1 16 8			7 33 16 2			22. 2
5 8 13 10			5 46 13 8		6 39 12 9	7 23 12 8	8 8 15 9		8 51 15 6			8 8 15 9			8 51 15 6			23. 2
6 27 13 9			7 3 14 1		8 7 12 7	8 49 12 9	9 32 15 4		10 12 15 4			9 32 15 4			10 12 15 4			24. 2
7 39 14 6			8 12 15 0		9 27 13 1	10 2 13 4	10 53 15 6		11 28 15 9			10 53 15 6			11 28 15 9			25. 2
8 38 15 6			9 0 15 11		10 12 13 8	10 57 14 0	12 0 16 1		— — —			12 0 16 1			— — —			26. 2
9 22 16 5			9 41 16 10		11 19 14 4	11 37 14 8	0 24 16 5		0 44 16 10			0 24 16 5			0 44 16 10			27. 2
9 59 17 3			10 17 17 7		11 54 15 0	— — —	1 5 17 2		1 24 17 6			1 5 17 2			1 24 17 6			28. 2
10 34 17 10			10 52 18 1		0 10 15 3	0 27 15 5	1 42 17 10		1 57 18 2			1 42 17 10			1 57 18 2			29. 2
Mean Spring } 9ft. 4in.			8ft. 0in.			9ft. 7in.												
Range.																		

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
0 17		9	2 55		17	5 44		25	8 31	
0 36		10	3 16		18	6 5		26	8 51	
0 55		11	3 37		19	6 26		27	9 11	
1 14		12	3 58		20	6 47		28	9 31	
1 34		13	4 19		21	7 8		29	9 51	
1 54		14	4 40		22	7 29		30	10 10	
2 14		15	5 1		23	7 50				
2 35		16	5 22		24	8 11				

s of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.

## SEPTEMBER, 1864.

WEEK DAY.		MONTH DAY.		MOON'S TRANSIT.		HARWICH.						HULL.						SUNDERLAND.						
						MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
						Time.		Height.	Time.		Height.	Time.		Height.	Time.		Height.	Time.		Height.	Time.		Height.	
						H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		
Th.	1	0	3	—	—				0	12	11	3	6	29	19	10	6	45	20	0	3	22	13	6
F.	2	0	45	0	27	11	4		0	41	11	4	7	0	20	3	7	15	20	4	3	52	13	11
S.	3	1	27	0	56	11	5		1	11	11	4	7	30	20	5	7	46	20	5	4	21	14	2
Th.	4	2	10	1	27	11	4		1	42	11	3	8	1	20	5	8	16	20	4	4	51	14	1
F.	5	2	55	1	58	11	2		2	13	11	1	8	31	20	2	8	46	19	11	5	21	13	9
Tu.	6	3	42	2	28	11	0		2	44	10	10	9	2	19	7	9	19	19	3	5	53	13	4
W.	7	4	31	3	1	10	9		3	19	10	7	9	37	18	9	9	55	18	4	6	30	12	9
Th.	8	5	23	3	37	10	5		3	57	10	2	10	18	17	10	10	41	17	5	7	13	12	1
F.	9	6	17	4	18	10	0		4	43	9	10	11	10	16	11	11	46	16	6	8	2	11	5
S.	10	7	13	5	13	9	8		5	47	9	7	—	—	—	—	0	24	16	2	9	10	10	11
Th.	11	8	10	6	27	9	7		7	14	9	9	1	3	16	1	1	42	16	3	10	34	10	11
F.	12	9	7	7	59	9	11		8	38	10	2	2	23	16	8	3	0	17	4	11	53	11	7
Tu.	13	10	3	9	15	10	6		9	49	10	10	3	36	18	2	4	9	19	1	0	27	12	2
W.	14	10	59	10	20	11	3		10	45	11	7	4	39	19	11	5	2	20	7	1	29	13	5
Th.	15	11	55	11	9	11	10		11	32	12	2	5	25	21	3	5	48	21	10	2	21	14	5
F.	16	morn.	11	55	12	4	—	—	—	—	—	—	6	12	22	4	6	35	22	8	3	5	15	3
S.	17	0	50	0	17	12	5		0	39	12	6	6	58	22	10	7	21	23	0	3	49	15	10
Th.	18	1	46	1	2	12	5		1	25	12	4	7	44	22	10	8	5	22	7	4	33	15	10
F.	19	2	41	1	46	12	2		2	8	12	0	8	26	22	2	8	48	21	8	5	17	15	3
Tu.	20	3	37	2	30	11	9		2	51	11	6	9	9	21	0	9	30	20	3	6	0	14	3
W.	21	4	31	3	12	11	2		3	33	10	10	9	51	19	6	10	16	18	7	6	46	13	3
Th.	22	5	24	3	56	10	6		4	19	10	2	10	42	17	10	11	14	17	2	7	37	12	1
F.	23	6	16	4	46	9	11		5	14	9	8	11	48	16	6	—	—	—	—	8	35	11	1
S.	24	7	4	5	46	9	6		6	29	9	5	0	24	15	11	1	4	15	7	9	54	10	6
Th.	25	7	51	7	15	9	5		7	57	9	6	1	43	15	6	2	22	15	9	11	15	10	6
F.	26	8	36	8	34	9	8		9	9	9	10	2	56	16	2	3	30	16	8	—	—	—	0
Tu.	27	9	19	9	39	10	1		10	6	10	4	4	1	17	3	4	26	17	10	0	51	11	6
W.	28	10	2	10	29	10	6		10	48	10	9	4	48	18	3	5	6	18	9	1	38	12	3
Th.	29	10	44	11	6	10	11		11	23	11	1	5	23	19	2	5	39	19	6	2	18	12	11
F.	30	11	26	11	40	11	3		11	56	11	4	5	56	19	10	6	13	20	1	2	52	13	5
Half Mean Spring } Rang						5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.						
Phases of the Moon.												Moon's Declination at Noon.												
D. H. M.												M.D. ° ' M.D.												

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.



## SEPTEMBER, 1864.

NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		
3 23 12 5	3 37 12 8		2 21 15 6	2 36 15 9		8 24 12 9	8 38 12 10		●									
3 52 12 9	4 7 12 10		2 50 15 10	3 3 15 11		8 52 12 11	9 6 12 11		1.2									
4 22 12 11	4 38 12 10		3 17 15 11	3 32 15 11		9 22 12 10	9 38 12 9		2.2									
4 54 12 9	5 10 12 8		3 48 15 9	4 4 15 8		9 54 12 8	10 9 12 6		3.2									
5 25 12 6	5 40 12 4		4 19 15 6	4 35 15 4		10 25 12 3	10 42 12 0		4.2									
5 57 12 2	6 14 11 11		4 51 15 2	5 8 14 11		11 0 11 9	11 20 11 4		5.2									
5 33 11 8	6 52 11 4		5 28 14 7	5 48 14 3		11 40 11 0	—		6.2									
7 15 11 0	7 40 10 8		6 11 13 9	6 35 13 5		0 3 10 7	0 27 10 3		7.2									
3 8 10 3	8 42 9 11		7 2 13 0	7 37 12 8		0 53 9 11	1 27 9 8		8.2									
2 21 9 9	10 4 9 9		8 14 12 5	8 57 12 4		2 5 9 5	2 49 9 4		9.2									
2 47 9 11	11 29 10 3		9 41 12 6	10 22 12 10		3 37 9 5	4 22 9 7		10.2									
—	0 7 10 8		11 0 13 3	11 34 13 9		5 1 9 11	5 36 10 5		11.2									
2 40 11 1	1 11 11 8		—	0 5 14 5		6 7 11 1	6 32 11 10		12.2									
2 38 12 2	2 2 12 9		0 32 15 1	0 56 15 9		6 54 12 7	7 13 13 4		13.2									
2 24 13 4	2 45 13 10		1 20 16 5	1 42 17 0		7 32 13 11	7 52 14 5		14.2									
3 6 14 3	3 27 14 6		2 4 17 5	2 26 17 9		8 13 14 9	8 34 14 10		15.2									
3 49 14 8	4 12 14 9		2 46 17 11	3 8 17 11		8 57 14 11	9 20 14 9		16.2									
3 35 14 7	4 58 14 3		3 30 17 9	3 52 17 6		9 42 14 6	10 5 14 1		17.2									
3 20 13 11	5 43 13 7		4 14 17 1	4 37 16 8		10 27 13 7	10 49 13 1		18.2									
5 4 13 2	6 25 12 8		4 58 16 3	5 20 15 8		11 11 12 6	11 36 11 11		19.2									
5 48 12 2	7 13 11 7		5 44 15 1	6 10 14 5		—	0 1 11 3		20.2									
7 41 11 0	8 12 10 4		6 36 13 9	7 6 13 2		0 28 10 7	0 58 10 1		21.2									
3 44 9 11	9 22 9 7		7 38 12 8	8 14 12 3		1 29 9 7	2 6 9 2		22.2									
2 6 9 5	10 47 9 5		8 59 12 0	9 42 12 0		2 52 9 0	3 39 8 10		23.2									
1 27 9 7	—		10 21 12 1	10 56 12 4		4 20 8 10	4 57 9 0		24.2									
2 3 9 10	0 35 10 1		11 28 12 7	11 58 12 11		5 30 9 3	5 59 9 8		25.2									
1 3 10 4	1 27 10 9		—	0 21 13 5		6 23 10 2	6 41 10 8		26.2									
1 47 11 1	2 5 11 5		0 41 13 10	0 59 14 3		6 58 11 1	7 13 11 6		27.2									
2 22 11 9	2 37 12 1		1 17 14 8	1 34 15 1		7 26 12 0	7 40 12 4		28.2									
2 53 12 4	3 7 12 7		1 50 15 5	2 5 15 8		7 54 12 8	8 9 12 11		●									
in Spring } 6ft. 8in.						8ft. 2in.						6ft. 7in.						
ge.																		

## Equation of Time at Noon.

S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
17		9	2 55		17	5 44		25	8 31	
36		10	3 16		18	6 5		26	8 51	
55		11	3 37		19	6 26		27	9 11	
14		12	3 58		20	6 47		28	9 31	
34		13	4 19		21	7 8		29	9 51	
54		14	4 40		22	7 29		30	10 10	
14		15	5 1		23	7 50				
35		16	5 22		24	8 11				

f High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
 NTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.



## SEPTEMBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.																																																																																																																																																																																																																																																																																																																																																																																																																																																			
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																																																																																																																																																																																																																																																																																																																																																																																																																																																
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																																																																																																																																																																																																																																																																																																																																																																																																																																															
Th.	1	0 8 3	—	—	0 4	9 4	11 16	24 10	11 32	25 1	6 8	19 11	6 23	20 2	F.	2	0 45	0 20	9 5	0 35	9 6	11 47	25 4	—	—	6 38	20 5	6 53	20 6	S.	3	1 27	0 50	9 7	1 6	9 7	0 2	25 5	0 18	25 6	7 8	20 7	7 23	20 7	S.	4	2 10	1 23	9 7	1 39	9 7	0 34	25 5	0 49	25 4	7 39	20 4	7 53	20 5	M.	5	2 55	1 53	9 7	2 7	9 6	1 4	25 2	1 18	24 10	8 8	19 11	8 24	19 11	Tu.	6	3 42	2 23	9 5	2 39	9 4	1 33	24 5	1 49	23 11	8 41	19 3	8 59	18 9	W.	7	4 31	2 56	9 2	3 14	9 1	1 2	7 23	4	2 25	22 10	9 16	18 3	9 35	17 9	Th.	8	5 23	3 35	8 11	3 56	8 9	2 45	22 2	3 7	21 7	9 54	17 3	10 16	16 1	F.	9	6 17	4 19	8 8	4 48	8 6	3 31	21 0	4 2	20 5	10 42	16 1	11 10	15 6	S.	10	7 13	5 21	8 4	5 59	8 3	4 38	19 11	5 21	19 9	11 44	15 4	—	—	S.	11	8 10	6 41	8 2	7 25	8 3	6 7	20 0	6 55	20 6	0 22	15 5	1 9	15 5	M.	12	9 7	8 6	8 6	8 43	8 9	7 34	21 3	8 12	22 2	1 55	16 4	2 36	17 3	Tu.	13	10 3	9 19	9 0	9 49	9 3	8 43	23 3	9 12	24 4	3 14	18 2	3 47	19 1	W.	14	10 59	10 16	9 6	10 41	9 9	9 36	25 4	9 58	26 4	4 16	20 2	4 44	21 1	Th.	15	11 55	11 6	9 11	11 30	10 1	10 20	27 1	10 43	27 8	5 10	21 10	5 35	22 6	F.	16	morn.	11 54	10 3	—	—	11 6	28 3	11 29	28 6	5 58	22 11	6 21	23 3	S.	17	0 50	0 17	10 5	0 41	10 6	11 52	28 8	—	—	6 44	23 5	7 6	23 3	S.	18	1 46	1 5	10 5	1 27	10 4	0 15	28 7	0 38	28 3	7 27	22 11	7 49	22 6	M.	19	2 41	1 48	10 3	2 9	10 1	0 59	27 9	1 20	27 0	8 11	21 11	8 31	21 3	Tu.	20	3 37	2 30	9 11	2 50	9 8	1 39	26 2	2 0	25 3	8 52	20 6	9 12	19 7	W.	21	4 31	3 10	9 5	3 33	9 2	2 21	24 3	2 43	23 2	9 33	18 7	9 55	17 9	Th.	22	5 24	3 57	8 11	4 23	8 9	3 8	22 2	3 34	21 2	10 18	16 11	10 42	16 0	F.	23	6 16	4 50	8 6	5 20	8 3	4 3	20 4	4 38	19 7	11 8	15 3	11 44	14 10	S.	24	7 4	6 0	8 0	6 42	7 11	5 23	19 3	6 9	19 2	—	—	0 23	14 7	S.	25	7 51	7 23	7 11	8 1	8 0	6 53	19 4	7 30	19 9	1 7	14 8	1 50	15 0	M.	26	8 36	8 37	8 2	9 9	8 4	8 5	20 3	8 35	20 11	2 28	15 5	3 3	16 1	Tu.	27	9 19	9 36	8 7	9 58	8 9	9 0	21 8	9 21	22 4	3 32	16 10	3 56	17 5	W.	28	10 2	10 19	8 10	10 38	9 0	9 39	22 11	9 56	23 6	4 19	18 0	4 40	18 7	Th.	29	10 44	10 56	9 2	11 14	9 3	10 11	24 0	10 28	24 5	4 59	19 1	5 18	19 6	F.	30	11 26	11 31	9 4	11 48	9 5	10 45	24 10	11 1	25 1	5 36	19 11	5 53	20 2
Half Mean Spring Range.			4ft. 10in.			13ft. 0in.			10ft. 6in.																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Phases of the Moon.										Moon's Declination at Noon.																																																																																																																																																																																																																																																																																																																																																																																																																																																								
D. H. M.										M.D. ° ' "																																																																																																																																																																																																																																																																																																																																																																																																																																																								
New - - - - - 1 6 8 Morning.										1 3 N. 5 9 19 8.50										17 8 N. 45 25 14 N. 27																																																																																																																																																																																																																																																																																																																																																																																																																																														
First Quarter - 9 5 50 Morning.										2 0 S. 56 10 19 19										18 12 56 26 11 22																																																																																																																																																																																																																																																																																																																																																																																																																																														
Full - - - - - 15 9 9 Afternoon.										3 4 56 11 17 36										19 16 13 27 7 51																																																																																																																																																																																																																																																																																																																																																																																																																																														
Last Quarter - 22 6 54 Afternoon.										4 8 46 12 14 45										20 18 28 28 4 3																																																																																																																																																																																																																																																																																																																																																																																																																																														
New - - - - - 30 10 43 Afternoon.										5 12 17 13 10 54										21 19 36 29 0 4																																																																																																																																																																																																																																																																																																																																																																																																																																														
										6 15 19 14 6 16										22 19 40 30 3 55																																																																																																																																																																																																																																																																																																																																																																																																																																														
In Perigee - - 15 8 0 Morning.										7 17 42 15 1 12										23 18 44																																																																																																																																																																																																																																																																																																																																																																																																																																														
In Apogee - - 28 5 0 Morning.										8 19 16 16 3 N. 55										24 16 57																																																																																																																																																																																																																																																																																																																																																																																																																																														

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

## SEPTEMBER, 1864.

WEEK DAY.	MONTH DAY.	WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	
Th.	1	6 50 35 5	7 6 35 10	10 9 15 4	10 23 15 6	11 6 10 7	11 20 10 8	●						
F.	2	7 22 36 3	7 36 36 6	10 36 15 7	10 49 15 8	11 34 10 9	11 49 10 9	1.2						
S.	3	7 52 36 6	8 7 36 6	11 3 15 8	11 18 15 7	—	—	2.2						
M.	4	8 22 36 4	8 36 36 2	11 34 15 6	11 50 15 5	0 22 10 8	0 38 10 7	3.2						
M.	5	8 49 35 10	9 4 35 5	—	0 6 15 3	0 53 10 6	1 9 10 5	4.2						
Tu.	6	9 19 34 11	9 35 34 1	0 23 15 0	0 42 14 9	1 26 10 3	1 43 10 1	5.2						
W.	7	9 50 33 3	10 6 32 4	1 2 14 4	1 22 14 0	2 2 9 11	2 22 9 9	6.2						
Th.	8	10 23 31 5	10 43 30 6	1 45 13 8	2 8 13 4	2 44 9 6	3 7 9 4	7.2						
F.	9	11 9 29 6	11 41 28 9	2 35 13 0	3 8 12 8	3 33 9 2	4 7 8 11	8.2						
S.	10	—	0 19 28 4	3 46 12 5	4 30 12 5	4 44 8 9	5 23 8 9	9.2						
M.	11	1 0 28 6	1 46 29 0	5 14 12 7	5 56 12 11	6 3 8 10	6 43 9 0	10.2						
M.	12	2 28 29 11	3 9 31 2	6 34 13 4	7 8 13 10	7 21 9 4	7 56 9 8	11.2						
Tu.	13	3 50 32 8	4 26 34 3	7 39 14 5	8 8 15 1	8 31 10 0	9 2 10 4	12.2						
W.	14	4 57 35 10	5 25 37 4	8 32 15 8	8 54 16 3	9 30 10 8	9 53 11 0	13.2						
Th.	15	5 51 38 7	6 16 39 7	9 15 16 8	9 37 17 1	10 14 11 3	10 34 11 6	14.2						
F.	16	6 40 40 4	7 4 40 10	9 58 17 5	10 19 17 7	10 56 11 9	11 17 11 10	15.2						
S.	17	7 27 41 2	7 49 40 11	10 40 17 8	11 1 17 6	11 40 11 10	—	16.2						
M.	18	8 11 40 6	8 31 39 11	11 22 17 3	11 45 17 0	0 4 11 9	0 26 11 7	17.2						
M.	19	8 51 39 0	9 10 38 0	—	0 8 16 7	0 48 11 5	1 11 11 2	18.2						
Tu.	20	9 28 36 9	9 47 35 4	0 31 16 1	0 54 15 6	1 33 10 10	1 55 10 6	19.2						
W.	21	10 5 33 9	10 24 32 3	1 18 14 11	1 43 14 3	2 18 10 2	2 43 9 10	20.2						
Th.	22	10 46 30 10	11 10 29 5	2 9 13 8	2 39 13 2	3 8 9 6	3 37 9 3	21.2						
F.	23	11 40 28 3	—	3 11 12 7	3 47 12 3	4 8 8 11	4 44 8 8	22.2						
S.	24	0 20 27 6	1 1 27 2	4 32 12 1	5 15 12 1	5 24 8 6	6 4 8 6	23.2						
M.	25	1 44 27 3	2 23 27 9	5 55 12 2	6 30 12 5	6 42 8 8	7 17 8 10	24.2						
M.	26	3 1 28 5	3 37 29 3	7 2 12 8	7 31 13 0	7 50 9 0	8 21 9 2	25.2						
Tu.	27	4 9 30 4	4 35 31 4	7 56 13 5	8 17 13 10	8 48 9 5	9 11 9 8	26.2						
W.	28	5 0 32 4	5 21 33 3	8 35 14 2	8 51 14 6	9 33 9 10	9 51 10 0	27.2						
Th.	29	5 40 34 1	5 59 34 9	9 7 14 10	9 23 15 1	10 6 10 3	10 21 10 5	28.2						
F.	30	6 18 35 4	6 35 35 10	9 38 15 4	9 54 15 6	10 36 10 7	10 51 10 8	●						
Half Mean Spring Range.		18 ft. 7 in.				8 ft. 0 in.				5 ft. 6 in.				

## Equation of Time at Noon.

M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
1	0 17		9	2 55		17	5 44		25	8 31	
2	0 36		10	3 16		18	6 5		26	8 51	
3	0 55		11	3 37		19	6 26		27	9 11	
4	1 14		12	3 58		20	6 47		28	9 31	
5	1 34		13	4 19		21	7 8		29	9 51	
6	1 54		14	4 40		22	7 29		30	10 10	
7	2 14		15	5 1		23	7 50				
8	2 35		16	5 22		24	8 11				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## SEPTEMBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
Th.	1	H. M.	10 45	9 3	10 59	9 3	7 59	7 4	8 13	7 5	5 13	10 9	5 29							
F.	2	0 45	11 13	9 4	11 27	9 4	8 26	7 6	8 40	7 6	5 43	11 0	5 57							
S.	3	1 27	11 42	9 3	11 57	9 3	8 54	7 6	9 8	7 5	6 12	10 11	6 27							
S.	4	2 10	—	—	0 13	9 3	9 23	7 4	9 37	7 3	6 43	10 9	6 58							
M.	5	2 55	0 29	9 3	0 45	9 2	9 50	7 1	10 5	6 11	7 13	10 5	7 29							
Tu.	6	3 42	1 2	9 1	1 21	9 0	10 22	6 10	10 41	6 7	7 46	9 11	8 4							
W.	7	4 31	1 41	8 11	2 3	8 9	11 2	6 4	11 29	6 1	8 23	9 4	8 46							
Th.	8	5 23	2 27	8 7	2 51	8 5	11 57	5 10	—	—	9 12	8 9	9 41							
F.	9	6 17	3 17	8 4	3 49	8 2	0 31	5 7	1 11	5 6	10 17	8 4	10 56							
S.	10	7 13	4 25	8 1	5 4	8 0	1 57	5 5	2 41	5 6	11 37	8 2	—							
S.	11	8 10	5 44	8 0	6 27	8 1	3 22	5 9	4 0	6 1	0 18	8 4	1 1							
M.	12	9 7	7 6	8 2	7 42	8 5	4 33	6 4	5 1	6 8	1 39	8 10	2 15							
Tu.	13	10 3	8 13	8 8	8 41	9 0	5 27	6 11	5 52	7 3	2 45	9 9	3 12							
W.	14	10 59	9 6	9 3	9 29	9 6	6 16	7 7	6 40	7 10	3 34	10 9	3 55							
Th.	15	11 55	9 51	9 9	10 13	9 11	7 4	8 1	7 27	8 4	4 17	11 8	4 40							
F.	16	morn.	10 35	10 0	10 56	10 0	7 49	8 6	8 9	8 7	5 3	12 3	5 26							
S.	17	0 50	11 18	10 0	11 39	10 0	8 31	8 7	8 51	8 6	5 48	12 5	6 9							
S.	18	1 46	—	—	0 1	9 11	9 12	8 4	9 32	8 1	6 31	12 1	6 53							
M.	19	2 41	0 24	9 10	0 47	9 8	9 52	7 10	10 12	7 6	7 15	11 4	7 36							
Tu.	20	3 37	1 9	9 6	1 32	9 4	10 33	7 3	10 57	6 10	7 56	10 6	8 19							
W.	21	4 31	1 58	9 1	2 25	8 10	11 27	6 5	12 0	6 0	8 44	9 6	9 13							
Th.	22	5 24	2 52	8 7	3 21	8 4	—	—	0 37	5 8	9 45	8 8	10 19							
F.	23	6 16	3 50	8 2	4 25	8 0	1 16	5 6	1 59	5 4	10 56	8 1	11 39							
S.	24	7 4	5 6	7 11	5 46	7 10	2 43	5 4	3 23	5 6	—	—	0 19							
S.	25	7 51	6 25	7 10	7 2	7 10	3 59	5 8	4 29	5 10	0 59	8 0	1 35							
M.	26	8 36	7 36	8 0	8 6	8 2	4 57	6 0	5 21	6 2	2 9	8 4	2 38							
Tu.	27	9 19	8 30	8 4	8 50	8 7	5 42	6 5	6 1	6 7	3 1	9 0	3 21							
W.	28	10 2	9 9	8 9	9 26	8 11	6 19	6 9	6 37	6 11	3 38	9 8	3 53							
Th.	29	10 44	9 42	9 1	9 58	9 2	6 54	7 1	7 11	7 3	4 8	10 3	4 24							
F.	30	11 26	10 14	9 3	10 30	9 4	7 28	7 4	7 44	7 5	4 41	10 8	4 58							
Half Mean Spring } Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.					
Phases of the Moon.										Moon's Declination at Noon.										
D. H. M.										M.D. ° ' "										
New - - - - -	1	6	8	Morning.						1	3 N. 5	9	19 S. 50	17	8 N. 45	25	1			
First Quarter -	9	5	50	Morning.						2	0 S. 56	10	19 19	18	12 56	26	1			
Full - - - - -	15	9	9	Afternoon.						3	4 56	11	17 36	19	16 13	27				
Last Quarter -	22	6	54	Afternoon.						4	8 46	12	14 45	20	18 28	28				
New - - - - -	30	10	43	Afternoon.						5	12 17	13	10 54	21	19 36	29				
										6	15 19	14	6 16	22	19 40	30				
In Perigee - -	15	8	0	Morning.						7	17 42	15	1 12	23	18 44					
In Apogee - -	28	5	0	Morning.						8	19 16	16	3 N. 55	24	16 57					

The times for High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 2 m. | LONDONDERRY add 4 m. | SLIGO BAY add 9 m.

## SEPTEMBER, 1864.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age At Noon.
Morning.		Afternoon.			Morning.		Afternoon.			Morning.		Afternoon.			
Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.		
4 32	14 0	4 46	14 2	4 56	11 3	5 12	11 4	5 19	11 10	5 34	12 0	●			
5 1	14 4	5 16	14 6	5 28	11 5	5 43	11 6	5 48	12 1	6 3	12 2	1'2			
5 32	14 6	5 48	14 5	5 59	11 6	6 15	11 6	6 19	12 2	6 36	12 2	2'2			
6 4	14 4	6 19	14 2	6 31	11 5	6 45	11 4	6 52	12 2	7 7	12 1	3'2			
6 34	14 0	6 50	13 9	7 0	11 3	7 16	11 1	7 21	12 0	7 36	11 11	4'2			
7 8	13 5	7 27	13 1	7 32	10 10	7 49	10 7	7 52	11 9	8 9	11 7	5'2			
7 47	12 9	8 9	12 3	8 7	10 5	8 25	10 1	8 26	11 4	8 43	11 1	6'2			
8 32	11 9	8 57	11 3	8 45	9 10	9 8	9 7	9 10	10 10	9 22	10 7	7'2			
9 28	10 11	10 4	10 8	9 34	9 4	10 5	9 1	9 51	10 3	10 27	10 0	8			
0 45	10 7	11 29	10 10	10 44	9 0	11 26	9 11	11 5	9 10	11 44	9 10	9'2			
—	—	0 13	11 1	—	—	0 11	9 3	—	—	0 24	10 0	10'2			
0 51	11 7	1 26	12 2	0 52	9 6	1 33	9 11	1 3	10 3	1 41	10 7	11'2			
1 56	12 10	2 26	13 6	2 10	10 4	2 41	10 10	2 20	11 1	2 56	11 7	12'2			
2 52	14 2	3 15	14 10	3 10	11 3	3 35	11 9	3 26	12 1	3 54	12 6	13'2			
3 37	15 4	4 0	15 10	3 59	12 2	4 23	12 6	4 20	12 11	4 46	13 2	○			
4 22	16 3	4 44	16 6	4 46	12 9	5 10	12 11	5 9	13 4	5 31	13 6	15'2			
5 7	16 7	5 30	16 6	5 34	12 11	5 57	12 11	5 54	13 7	6 17	13 7	16'2			
5 52	16 3	6 14	15 11	6 19	12 9	6 41	12 6	6 40	13 5	7 2	13 3	17'2			
6 36	15 5	6 58	14 11	7 2	12 3	7 22	11 10	7 23	13 0	7 43	12 9	18'2			
7 20	14 4	7 43	13 8	7 43	11 5	8 3	11 0	8 2	12 5	8 21	12 0	19'2			
8 8	12 11	8 33	12 1	8 23	10 6	8 46	10 1	8 41	11 6	9 2	11 12	20'2			
9 0	11 5	9 29	10 11	9 10	9 8	9 34	9 3	9 25	10 8	9 52	10 3	21			
0 4	10 5	10 47	10 3	10 4	8 11	10 45	8 9	10 27	9 10	11 6	9 7	22'2			
1 30	10 3	—	—	11 27	8 8	—	—	11 45	9 5	—	—	23'2			
0 11	10 4	0 47	10 7	0 9	8 8	0 47	8 10	0 23	9 5	0 58	9 7	24'2			
1 20	10 11	1 49	11 4	1 25	9 1	1 59	9 4	1 33	9 9	2 8	10 12	25'2			
2 13	11 9	2 35	12 2	2 28	9 7	2 51	9 11	2 39	10 5	3 5	10 8	26'2			
2 55	12 7	3 13	12 11	3 13	10 3	3 32	10 6	3 29	11 0	3 50	11 3	27'2			
3 29	13 3	3 45	13 7	3 49	10 9	4 7	11 0	4 9	11 6	4 29	11 9	28'2			
4 1	13 11	4 17	14 2	4 24	11 2	4 41	11 4	4 47	11 11	5 4	12 0	●			
Mean Spring } 7ft. 5in.					5ft. 10in.					6ft. 2in.					
Range.															

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
0 17		9	2 55		17	5 44		25	8 31	
0 36		10	3 16		18	6 5		26	8 51	
0 55		11	3 37		19	6 26		27	9 11	
1 14		12	3 58		20	6 47		28	9 31	
1 34		13	4 19		21	7 8		29	9 51	
1 54		14	4 40		22	7 29		30	10 10	
2 14		15	5 1		23	7 50				
2 35		16	5 22		24	8 11				

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 5 m.

OCTOBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
S.	1	0 9	3 47	18 7	3 57	18 9	5 37	14 11	5 53	15 3	11 37	12 5	11 53	1									
☾	2	0 53	4 13	18 10	4 28	18 9	6 9	15 1	6 25	15 2	—	—	0 10	1									
M.	3	1 40	4 43	18 8	4 59	18 6	6 40	15 1	6 54	14 11	0 27	12 6	0 44	1									
Tu.	4	2 28	5 15	18 4	5 31	18 0	7 8	14 10	7 24	14 7	0 59	12 4	1 16	1									
W.	5	3 19	5 49	17 8	6 7	17 3	7 41	14 6	7 58	14 1	1 33	12 2	1 50	1									
Th.	6	4 12	6 27	16 9	6 49	16 1	8 16	14 1	8 34	13 6	2 8	11 9	2 28	1									
F.	7	5 6	7 14	15 6	7 39	14 11	8 54	13 7	9 17	12 10	2 50	11 4	3 13	1									
S.	8	6 1	8 8	14 5	8 41	14 0	9 43	13 0	10 13	12 4	3 37	10 10	4 5	1									
☾	9	6 55	9 18	13 10	10 3	14 0	10 49	12 9	11 26	12 1	4 37	10 3	5 13	1									
M.	10	7 50	10 49	14 4	11 32	14 10	—	—	0 13	12 10	5 55	10 2	6 38	1									
Tu.	11	8 44	—	—	0 8	15 7	0 58	12 6	1 40	13 7	7 19	10 7	7 57	1									
W.	12	9 39	0 42	16 5	1 11	17 4	2 18	13 5	2 53	14 7	8 33	11 6	9 3	1									
Th.	13	10 33	1 36	18 3	2 0	19 1	3 21	14 6	3 50	15 6	9 30	12 5	9 55	1									
F.	14	11 28	2 23	19 10	2 46	20 5	4 17	15 5	4 43	16 3	10 19	13 1	10 42	1									
S.	15	morn.	3 9	20 10	3 31	20 11	5 7	16 2	5 30	16 7	11 7	13 6	11 28	1									
☾	16	0 24	3 54	20 11	4 17	20 10	5 54	16 5	6 16	16 6	11 51	13 7	—										
M.	17	1 21	4 39	20 7	5 12	20 2	6 38	16 4	6 59	16 1	0 14	13 6	0 37	1									
Tu.	18	2 17	5 21	19 6	5 41	19 0	7 21	15 11	7 37	15 6	1 0	13 2	1 22	1									
W.	19	3 13	6 2	18 3	6 23	17 5	7 56	15 3	8 14	14 7	1 43	12 7	2 3	1									
Th.	20	4 6	6 45	16 7	7 9	15 9	8 34	14 5	8 52	13 6	2 24	11 11	2 46	1									
F.	21	4 58	7 34	14 11	8 0	14 2	9 14	13 6	9 37	12 6	3 9	11 2	3 32	1									
S.	22	5 46	8 29	13 7	9 1	13 2	10 2	12 8	10 32	11 8	3 57	10 5	4 25	1									
☾	23	6 32	9 40	13 0	10 20	13 0	11 2	12 1	11 40	11 4	4 55	9 10	5 32										
M.	24	7 16	11 1	13 2	11 37	13 5	—	—	0 20	12 1	6 10	9 7	6 50										
Tu.	25	7 59	—	—	0 11	13 11	0 58	11 8	1 34	12 7	7 25	9 11	7 59	1									
W.	26	8 41	0 41	14 5	1 5	14 11	2 9	12 4	2 36	13 3	8 31	10 6	8 56	1									
Th.	27	9 23	1 26	15 6	1 45	16 2	3 2	13 8	3 26	13 11	9 18	11 1	9 39	1									
F.	28	10 6	2 3	16 8	2 20	17 2	3 49	14 0	4 10	14 6	9 58	11 7	10 16	1									
S.	29	10 50	2 37	17 9	2 54	18 1	4 30	14 6	4 48	14 9	10 32	12 0	10 49	1									
☾	30	11 36	3 11	18 4	3 28	18 6	5 6	14 11	5 23	15 0	11 7	12 3	11 23	1									
M.	31	0 25	3 45	18 7	4 3	18 8	5 41	15 1	5 58	15 2	11 41	12 5	12 0	1									
Half Mean Spring } Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.								
Phases of the Moon.												Moon's Declination at Noon.											
D. H. M.												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	
First Quarter - 8 3 37 Afternoon.												1	7	8.48	9	15	8.40	17	17 N.34	25	5		
Full - - - - 15 6 15 Morning.												2	11	24	10	12	16	18	19 10	26	1		
Last Quarter - 22 11 27 Morning.												3	14	33	11	8	5	19	19 38	27	2		
New - - - - 30 3 28 Afternoon.												4	17	4	12	3	19	20	19 2	28	6		
												5	18	49	13	1 N.41		21	17 29	29	10		
In Perigee - - 13 6 0 Afternoon.												6	19	38	14	6	36	22	15 9	30	13		
In Apogee - - 25 6 0 Afternoon.												7	19	24	15	11	5	23	12 13	31	16		
												8	18	4	16	14	49	24	8 49				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4 m.

## SEPTEMBER, 1864.

MONTH DAY	GALWAY.								QUEENSTOWN.								WATERFORD.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	D.								
1	4 32	14 0	4 46	14 2	4 56	11 3	5 12	11 4	5 19	11 10	5 34	12 0	●												
2	5 1	14 4	5 16	14 6	5 28	11 5	5 43	11 6	5 48	12 1	6 3	12 2	1'2												
3	5 32	14 6	5 48	14 5	5 59	11 6	6 15	11 6	6 19	12 2	6 36	12 2	2'2												
4	6 4	14 4	6 19	14 2	6 31	11 5	6 45	11 4	6 52	12 2	7 7	12 1	3'2												
5	6 34	14 0	6 50	13 9	7 0	11 3	7 16	11 1	7 21	12 0	7 36	11 11	4'2												
6	7 8	13 5	7 27	13 1	7 32	10 10	7 49	10 7	7 52	11 9	8 9	11 7	5'2												
7	7 47	12 9	8 9	12 3	8 7	10 5	8 25	10 1	8 26	11 4	8 43	11 1	6'2												
8	8 32	11 9	8 57	11 3	8 45	9 10	9 8	9 7	9 1	10 10	9 22	10 7	7'2												
9	9 28	10 11	10 4	10 8	9 34	9 4	10 5	9 1	9 51	10 3	10 27	10 0	8'2												
10	10 45	10 7	11 29	10 10	10 44	9 0	11 26	9 11	11 5	9 10	11 44	9 10	9'2												
11	—	—	0 13	11 1	—	—	0 11	9 3	—	—	0 24	10 0	10'2												
12	0 51	11 7	1 26	12 2	0 52	9 6	1 33	9 11	1 3	10 3	1 41	10 7	11'2												
13	1 56	12 10	2 26	13 6	2 10	10 4	2 41	10 10	2 20	11 1	2 56	11 7	12'2												
14	2 52	14 2	3 15	14 10	3 10	11 3	3 35	11 9	3 26	12 1	3 54	12 6	13'2												
15	3 37	15 4	4 0	15 10	3 59	12 2	4 23	12 6	4 20	12 11	4 46	13 2	14'2												
16	4 22	16 3	4 44	16 6	4 46	12 9	5 10	12 11	5 9	13 4	5 31	13 6	15'2												
17	5 7	16 7	5 30	16 6	5 34	12 11	5 57	12 11	5 54	13 7	6 17	13 7	16'2												
18	5 52	16 3	6 14	15 11	6 19	12 9	6 41	12 6	6 40	13 5	7 2	13 3	17'2												
19	6 36	15 5	6 58	14 11	7 2	12 3	7 22	11 10	7 23	13 0	7 43	12 9	18'2												
20	7 20	14 4	7 43	13 8	7 43	11 5	8 3	11 0	8 2	12 5	8 21	12 0	19'2												
21	8 8	12 11	8 33	12 1	8 23	10 6	8 46	10 1	8 41	11 6	9 2	11 1	20'2												
22	9 0	11 5	9 29	10 11	9 10	9 8	9 34	9 3	9 25	10 8	9 52	10 3	21'2												
23	10 4	10 5	10 47	10 3	10 4	8 11	10 45	8 9	10 27	9 10	11 6	9 7	22'2												
24	11 30	10 3	—	—	11 27	8 8	—	—	11 45	9 5	—	—	23'2												
25	0 11	10 4	0 47	10 7	0 9	8 8	0 47	8 10	0 23	9 5	0 58	9 7	24'2												
26	1 20	10 11	1 49	11 4	1 25	9 1	1 59	9 4	1 33	9 9	2 8	10 1	25'2												
27	2 13	11 9	2 35	12 2	2 28	9 7	2 51	9 11	2 39	10 5	3 5	10 8	26'2												
28	2 55	12 7	3 13	12 11	3 13	10 3	3 32	10 6	3 29	11 0	3 50	11 3	27'2												
29	3 29	13 3	3 45	13 7	3 49	10 9	4 7	11 0	4 9	11 6	4 29	11 9	28'2												
30	4 1	13 11	4 17	14 2	4 24	11 2	4 41	11 4	4 47	11 11	5 4	12 0	●												
Half Mean Spring } 7ft. 5in. Range.				5ft. 10in.				6ft. 2in.																	

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
0 17		9	2 55		17	5 44		25	8 31	
0 36		10	3 16		18	6 5		26	8 51	
0 55		11	3 37		19	6 26		27	9 11	
1 14		12	3 58		20	6 47		28	9 31	
1 34		13	4 19		21	7 8		29	9 51	
1 54		14	4 40		22	7 29		30	10 10	
2 14		15	5 1		23	7 50				
2 35		16	5 22		24	8 11				

uses of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 5 m.

OCTOBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.																														
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTER.																										
			Time.	Height.	H. M. F. I.	H. M. F. I.	Time.	Height.	H. M. F. I.	H. M. F. I.	Time.	Height.	H. M. F. I.	H. M. F. I.	Time.	Height.	H. M. F. I.	H. M. F. I.	Time.	Height.	H. M. F. I.	H. M. F. I.																											
S.	1	0 0 9	—	—	—	0 12 11 5	6 30 20 3	6 45 20 5	3 22 13 11	3 37																																							
S.	2	0 53	0 27 11 6	0 41 11 6	7 0 20 7	7 17 20 8	3 52 14 2	4 7																																									
M.	3	1 40	0 57 11 6	1 14 11 5	7 33 20 7	7 48 20 6	4 22 14 3	4 38																																									
Tu.	4	2 28	1 29 11 4	1 45 11 3	8 3 20 5	8 19 20 3	4 54 14 0	5 10																																									
W.	5	3 19	2 2 11 2	2 19 11 0	8 36 19 11	8 54 19 7	5 27 13 7	5 45																																									
Th.	6	4 12	2 36 10 10	2 55 10 8	9 13 19 2	9 33 18 8	6 4 12 11	6 27																																									
F.	7	5 6	3 15 10 6	3 36 10 4	9 55 18 2	10 20 17 9	6 51 12 4	7 16																																									
S.	8	6 1	3 59 10 2	4 24 10 0	10 50 17 3	11 24 16 10	7 43 11 8	8 14																																									
S.	9	6 55	4 54 9 10	5 27 9 9	—	—	0 3 16 6	8 49 11 2	9 29																																								
M.	10	7 50	6 4 9 9	6 53 9 10	0 42 16 5	1 23 16 6	10 14 11 2	10 55																																									
Tu.	11	8 44	7 37 10 0	8 17 10 3	2 2 16 10	2 39 17 6	11 32 11 9	—																																									
W.	12	9 39	8 52 10 7	9 25 10 11	3 13 18 4	3 46 19 2	0 5 12 3	0 36																																									
Th.	13	10 33	9 54 11 3	10 20 11 6	4 14 19 11	4 38 20 8	1 4 13 5	1 31																																									
F.	14	11 28	10 45 11 10	11 9 12 1	5 1 21 3	5 25 21 9	1 56 14 5	2 21																																									
S.	15	morn.	11 33 12 3	11 56 12 4	5 49 22 1	6 13 22 4	2 44 15 1	3 6																																									
S.	16	0 24	—	—	0 17 12 4	6 35 22 5	6 58 22 6	3 27 15 6	3 49																																								
M.	17	1 21	0 39 12 3	1 2 12 2	7 21 22 5	7 43 22 2	4 11 15 6	4 32																																									
Tu.	18	2 17	1 24 12 0	1 46 11 10	8 4 21 9	8 26 21 4	4 54 15 0	5 16																																									
W.	19	3 13	2 8 11 7	2 29 11 4	8 46 20 8	9 8 20 0	5 37 14 1	5 59																																									
Th.	20	4 6	2 50 11 1	3 11 10 9	9 29 19 3	9 51 18 7	6 22 13 1	6 47																																									
F.	21	4 58	3 32 10 6	3 55 10 3	10 16 17 11	10 44 17 3	7 12 12 1	7 38																																									
S.	22	5 46	4 19 10 0	4 46 9 9	11 15 16 8	11 50 16 2	8 5 11 3	8 37																																									
S.	23	6 32	5 14 9 7	5 47 9 5	—	—	0 25 15 9	9 11 10 8	9 51																																								
M.	24	7 16	6 28 9 5	7 10 9 5	1 1 15 7	1 37 15 8	10 29 10 6	11 6																																									
Tu.	25	7 59	7 49 9 7	8 22 9 9	2 17 15 11	2 44 16 4	11 37 10 11	—																																									
W.	26	8 41	8 55 9 11	9 24 10 2	3 16 16 10	3 46 17 4	0 7 11 3	0 35																																									
Th.	27	9 23	9 48 10 4	10 10 10 7	4 8 17 10	4 29 18 4	0 58 11 11	1 19																																									
F.	28	10 6	10 29 10 9	10 47 10 11	4 47 18 9	5 4 19 2	1 40 12 8	1 59																																									
S.	29	10 50	11 5 11 1	11 22 11 3	5 21 19 6	5 38 19 10	2 17 13 2	2 34																																									
S.	30	11 36	11 40 11 4	11 57 11 5	5 56 20 0	6 14 20 2	2 51 13 8	3 7																																									
M.	31	0 25	—	—	0 13 11 5	6 31 20 4	6 49 20 5	3 40																																									
Half Mean Spring Range.			5 ft. 9 in.								10 ft. 5 in.								7 ft. 2 in.																														
Phases of the Moon.																									Moon's Declination at Noon.																								
D. H. M.																									M. D. ° ' "																								
First Quarter - 8 3 37 Afternoon.																									1 7 8.48 9 15 8.40 17 17 N. 34 25 5																								
Full - - - 15 6 15 Morning.																									2 11 24 10 12 16 18 19 10 26 1																								
Last Quarter - 22 11 27 Morning.																									3 14 33 11 8 5 19 19 38 27 2																								
New - - - 30 3 28 Afternoon.																									4 17 4 12 3 19 20 19 2 28 6																								
In Perigee - 13 6 0 Afternoon.																									5 18 49 13 1 N. 41 21 17 29 29 10																								
In Apogee - 25 6 0 Afternoon.																									6 19 38 14 3 36 22 15 9 30 13																								
																									7 19 24 15 11 5 23 12 13 31 16																								
																									8 18 4 16 14 49 24 8 49																								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 HARWICH subtract 5 m.      HULL add 1 m.      SUNDERLAND add 5 m.



## OCTOBER, 1864.

NORTH SHIELDS.						LEITH.						THURSO.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		
3 23	12 10		3 38	12 11		2 21	15 11		2 36	16 0		8 24	13 0		8 38	13 1	0.6	
3 52	13 0		4 8	13 1		2 50	16 1		3 4	16 1		8 53	13 1		9 8	13 0	1.6	
4 24	13 0		4 40	12 11		3 19	16 0		3 35	15 11		9 25	12 11		9 41	12 9	2.6	
4 56	12 9		5 13	12 6		3 51	15 9		4 8	15 6		9 58	12 6		10 16	12 3	3.6	
5 31	12 4		5 49	12 2		4 26	15 4		4 43	15 11		10 34	12 0		10 54	11 8	4.6	
6 8	11 11		6 29	11 7		5 2	14 9		5 25	14 6		11 17	11 3		11 41	10 11	5.6	
6 52	11 3		7 19	10 11		5 49	14 1		6 15	13 8		—	—		0 7	10 6	6.6	
7 48	10 6		8 21	10 2		6 42	13 4		7 16	13 0		0 34	10 2		1 6	9 11	7.6	
8 59	10 0		9 42	9 11		7 53	12 9		8 34	12 8		1 44	9 8		2 26	9 7	8.6	
10 26	10 1		11 7	10 5		9 20	12 9		10 1	13 0		3 16	9 8		4 0	9 10	9.6	
11 46	10 9		—	—		10 39	13 5		11 12	13 11		4 40	10 1		5 14	10 6	10.6	
0 19	11 3		0 48	11 9		11 43	14 5		—	—		5 44	11 2		6 9	11 10	11.6	
1 14	12 3		1 37	12 9		0 8	15 1		0 32	15 8		6 31	12 6		6 51	13 2	12.6	
2 0	13 3		2 23	13 8		0 55	16 4		1 19	16 10		7 11	13 9		7 31	14 3	13.6	
2 44	14 0		3 6	14 3		1 42	17 3		2 5	17 6		7 53	14 6		8 14	14 7	14.6	
3 28	14 4		3 50	14 5		2 26	17 7		2 46	17 7		8 34	14 6		8 56	14 5	15.6	
4 12	14 4		4 34	14 0		3 7	17 5		3 29	17 2		9 19	14 2		9 42	13 10	16.6	
4 57	13 8		5 20	13 4		3 52	16 10		4 14	16 5		10 5	13 4		10 26	12 10	17.6	
5 42	12 11		6 3	12 6		4 36	15 11		4 57	15 6		10 48	12 4		11 12	11 9	18.6	
6 25	12 0		6 48	11 7		5 20	15 0		5 45	14 5		11 37	11 3		—	—	19.6	
7 14	11 0		7 42	10 6		6 11	13 10		6 37	13 3		0 2	10 8		0 29	10 2	20.6	
8 12	10 0		8 46	9 8		7 7	12 10		7 40	12 5		0 57	9 9		1 31	9 4	21.6	
9 23	9 6		10 3	9 5		8 15	12 2		8 57	12 0		2 7	9 1		2 50	8 11	22.6	
10 41	9 6		11 19	9 8		9 36	12 1		10 12	12 3		3 33	8 11		4 12	9 0	23.6	
11 51	9 11		—	—		10 44	12 5		11 14	12 9		4 45	9 2		5 16	9 5	24.6	
0 21	10 2		0 48	10 6		11 43	13 1		—	—		5 44	9 9		6 6	10 2	25.6	
1 10	10 9		1 28	11 1		0 4	13 5		0 22	13 10		6 23	10 7		6 40	11 1	26.6	
1 46	11 5		2 3	11 9		0 40	14 3		0 58	14 8		6 55	11 6		7 9	11 1	27.6	
2 20	12 1		2 35	12 4		1 15	15 0		1 32	15 4		7 23	12 4		7 38	12 7	28.6	
2 51	12 6		3 8	12 9		1 49	15 7		2 6	15 10		7 54	12 10		8 10	12 11	29.6	
3 24	12 10		3 41	12 11		2 22	15 11		2 38	16 0		8 26	13 0		8 43	13 0	30.6	
Mean Spring } 6ft. 8in.						8ft. 2in.						6ft. 7in.						
Tide Gauge.																		

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
10 29		9	12 49		17	14 41		25	15 53	
10 48		10	13 5		18	14 52		26	15 59	
11 6		11	13 20		19	15 3		27	16 4	
11 24		12	13 35		20	15 13		28	16 9	
11 42		13	13 49		21	15 22		29	16 12	
11 59		14	14 3		22	15 31		30	16 15	
12 16		15	14 16		23	15 39		31	16 17	
12 33		16	14 29		24	15 47				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

NORTH SHIELDS add 6 m.

LEITH add 13 m.

THURSO add 14 m.



OCTOBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.										
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTER.								
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.							
S.	1	on 9	—	—	0 5	9 6	11 17	25 5	11 33	25 7	6 9	20 5	6 24	—							
M.	2	0 53	0 21	9 7	0 37	9 8	11 49	25 8	—	—	6 40	20 9	6 55	—							
Tu.	3	1 40	0 53	9 8	1 10	9 8	0 42	25 8	0 20	25 7	7 10	20 7	7 26	—							
W.	4	2 28	1 25	9 7	1 41	9 7	0 36	25 5	0 52	25 2	7 42	20 3	7 59	—							
Th.	5	3 19	1 58	9 6	2 15	9 5	1 9	24 9	1 25	24 4	8 16	19 7	8 35	—							
F.	6	4 12	2 33	9 3	2 52	9 2	1 43	23 9	2 32	23 3	8 55	18 8	9 15	—							
S.	7	5 6	3 13	9 0	3 36	8 11	2 24	22 8	2 47	22 0	9 36	17 7	9 59	—							
M.	8	6 1	4 1	8 9	4 29	8 7	3 12	21 5	3 42	20 10	10 24	16 6	10 51	—							
Tu.	9	6 55	5 2	8 6	5 38	8 4	4 17	20 4	4 58	20 2	11 23	15 9	—	—							
W.	10	7 50	6 21	8 3	7 3	8 4	5 46	20 4	6 33	20 10	0 3	15 9	0 46	—							
Th.	11	8 44	7 44	8 6	8 20	8 9	7 13	21 6	7 49	22 5	1 32	16 6	2 12	—							
F.	12	9 39	8 55	9 1	9 24	9 3	8 20	23 5	8 47	24 5	2 49	18 3	3 20	—							
S.	13	10 33	9 51	9 6	10 16	9 9	9 11	25 4	9 34	26 2	3 50	20 2	4 18	—							
M.	14	11 28	10 42	9 11	11 7	10 0	9 57	26 11	10 21	27 5	4 45	21 8	5 11	—							
Tu.	15	morn.	11 31	10 2	11 55	10 3	10 44	27 9	11 7	28 0	5 36	22 7	5 59	—							
W.	16	0 24	—	—	0 18	10 3	11 30	28 0	11 52	27 11	6 21	22 10	6 43	—							
Th.	17	1 21	0 41	10 3	1 4	10 2	—	—	0 14	27 8	7 5	22 6	7 27	—							
F.	18	2 17	1 27	10 1	1 48	10 0	0 36	27 2	0 58	26 6	7 48	21 5	8 9	—							
S.	19	3 13	2 8	9 10	2 28	9 7	1 18	25 9	1 38	24 11	8 30	20 2	8 51	—							
M.	20	4 6	2 48	9 4	3 9	9 2	1 59	24 0	2 20	23 2	9 12	18 6	9 33	—							
Tu.	21	4 58	3 32	8 11	3 56	8 9	2 43	22 3	3 7	21 5	9 54	17 1	10 16	—							
W.	22	5 46	4 21	8 6	4 50	8 4	3 33	20 7	4 5	19 10	10 40	15 7	11 7	—							
Th.	23	6 32	5 21	8 2	5 58	8 0	4 40	19 4	5 21	19 2	11 41	14 10	—	—							
F.	24	7 16	6 36	7 11	7 15	8 0	6 4	19 3	6 45	19 6	0 17	14 9	0 59	—							
S.	25	7 59	7 49	8 1	8 23	8 3	7 18	19 11	7 51	20 6	1 37	15 2	2 14	—							
M.	26	8 41	8 53	8 5	9 18	8 7	8 20	21 1	8 42	21 9	2 47	16 2	3 13	—							
Tu.	27	9 23	9 39	8 9	10 0	8 11	9 22	22 4	9 20	23 0	3 36	17 5	3 59	—							
W.	28	10 6	10 19	9 0	10 37	9 1	9 38	23 6	9 54	24 0	4 20	18 6	4 40	—							
Th.	29	10 50	10 56	9 3	11 15	9 4	10 10	24 5	10 28	24 9	4 59	19 6	5 18	—							
F.	30	11 36	11 33	9 5	11 51	9 6	10 45	25 0	11 3	25 3	5 37	20 1	5 55	—							
S.	31	0 25	—	—	0 9	9 6	11 20	25 5	11 38	25 6	6 12	20 6	6 30	—							
Half Mean Spring Range.			4ft. 10in.				13ft. 0in.				10ft. 6in.										
Phases of the Moon.							Moon's Declination at Noon.														
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'			
First Quarter							8	3	37	Afternoon.	1	7	8.48	9	15	8.40	17	17	N.34	25	
Full - - - -							15	6	15	Morning.	2	11	24	10	12	16	18	19	10	26	
Last Quarter -							22	11	27	Morning.	3	14	33	11	8	5	19	19	38	27	
New - - - -							30	3	28	Afternoon.	4	17	4	12	3	19	20	19	2	28	
											5	18	49	13	1	N.41	21	17	29	29	1
In Perigee - -							13	6	0	Morning.	6	19	38	14	6	36	22	15	9	30	1
In Apogee - -							25	6	0	Afternoon.	7	19	24	15	11	5	23	12	13	31	1
											8	18	4	16	14	49	24	8	49		

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

GREENOCK add 19 m.

LIVERPOOL add 12 m.

PEMBROKE add 20 m.

## OCTOBER, 1864.

WESTON-SUPER-MARE.					HOLYHEAD.					KINGSTOWN.					C's AGE AT NOON.	
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.				
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.		D.
6 51 36 2		7 7 36 7	10 9 15 8		10 22 15 9	11 6 10 9	11 20 10 10									0.6
7 23 36 10		7 38 36 10	10 36 15 10		10 50 15 9	11 36 10 10	11 52 10 10									1.6
7 54 36 8		8 9 36 6	11 5 15 8		11 21 15 7	—	—									2.6
8 24 36 3		8 40 35 10	11 39 15 5		11 57 15 2	0 25 10 8	0 42 10 7									3.6
8 56 35 4		9 12 34 8	—		0 16 14 11	1 0 10 5	1 18 10 3									4.6
9 30 33 11		9 48 33 0	0 36 14 8		0 59 14 3	1 37 10 0	1 59 9 10									5.6
10 6 32 1		10 26 31 2	1 22 13 11		1 48 13 7	2 22 9 8	2 47 9 6									6.6
10 51 30 3		11 22 29 6	2 15 13 3		2 47 12 11	3 14 9 3	3 46 9 1									7.6
11 58 29 0		—	3 25 12 9		4 7 12 8	4 23 8 11	5 2 8 10									8.6
0 40 29 0		1 24 29 6	4 53 12 10		5 35 13 1	5 44 8 11	6 22 9 1									9.6
1 2 6 30 3		2 45 31 6	6 13 13 6		6 46 14 0	7 0 9 5	7 34 9 8									10.6
1 3 23 32 9		3 58 34 3	7 16 14 6		7 43 15 1	8 7 10 0	8 36 10 4									11.6
1 4 29 35 9		4 58 37 1	8 7 15 8		8 30 16 2	9 4 10 8	9 29 10 11									12.6
1 5 26 38 3		5 52 39 1	8 52 16 7		9 15 16 11	9 52 11 2	10 13 11 5									13.6
1 6 18 39 8		6 42 39 11	9 38 17 2		9 59 17 3	10 34 11 7	10 56 11 8									14.6
1 7 54 40 2		7 27 40 1	10 19 17 3		10 39 17 2	11 18 11 8	11 40 11 7									15.6
1 7 48 39 8		8 9 39 1	11 0 17 0		11 23 16 8	—	—									16.6
1 8 30 38 3		8 49 37 4	11 46 16 3		—	—	0 25 11 3									17.6
1 9 7 36 3		9 26 35 0	0 8 15 10		0 31 15 4	1 8 10 9	1 32 10 5									18.6
1 9 45 33 9		10 3 32 4	0 54 14 9		1 18 14 3	1 55 10 1	2 18 9 10									19.6
1 10 22 31 1		10 44 29 10	1 44 13 9		2 10 13 3	2 43 9 7	3 9 9 3									20.6
1 11 10 28 9		11 41 27 11	2 38 12 9		3 12 12 5	3 37 9 0	4 10 8 9									21.6
—		0 17 27 5	3 48 12 2		4 30 12 0	4 45 8 7	5 21 8 6									22.6
0 56 27 4		1 36 27 7	5 9 12 2		5 46 12 4	5 58 8 7	6 33 8 9									23.6
1 11 28 1		2 46 28 9	6 18 12 6		6 48 12 10	7 5 8 11	7 36 9 1									24.6
1 3 21 29 6		3 49 30 4	7 16 13 2		7 38 13 6	8 6 9 3	8 30 9 5									25.6
1 4 14 31 4		4 38 32 4	7 58 13 10		8 16 14 3	8 52 9 8	9 13 9 10									26.6
1 5 1 33 2		5 21 34 0	8 33 14 6		8 49 14 10	9 32 10 0	9 49 10 3									27.6
1 5 40 34 9		6 0 35 3	9 5 15 1		9 22 15 3	10 4 10 5	10 20 10 7									28.6
1 6 19 35 8		6 37 35 11	9 39 15 6		9 55 15 7	10 36 10 8	10 52 10 9									29.6
1 6 55 36 3		7 13 36 6	10 11 15 8		10 26 15 8	11 9 10 10	11 26 10 9									30.6
Mean Spring Range.		18 ft. 7 in.			8 ft. 0 in.			5 ft. 6 in.								

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
10 29		9	12 49		17	14 41		25	15 53	
10 48		10	13 5		18	14 52		26	15 59	
11 6		11	13 20		19	15 3		27	16 4	
11 24		12	13 35		20	15 13		28	16 9	
11 42		13	13 49		21	15 22		29	16 12	
11 59		14	14 3		22	15 31		30	16 15	
12 16		15	14 16		23	15 39		31	16 17	
12 33		16	14 29		24	15 47				

as of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## OCTOBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.					
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.			
			Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.	Time. H. M.	Height. F. I.		
S.	1	0 39	10 45	9 4	10 59	9 4	7 59	7 6	8 13	7 7	5 14	11 0	5 29	11		
M.	2	0 53	11 14	9 4	11 28	9 4	8 27	7 7	8 41	7 7	5 44	11 2	5 58	11		
Tu.	3	1 40	11 44	9 4	12 0	9 3	8 55	7 6	9 10	7 4	6 14	10 11	6 30	11		
W.	4	2 28	—	—	0 18	9 3	9 25	7 3	9 41	7 1	6 47	10 7	7 4	11		
Th.	5	3 19	0 36	9 2	0 54	9 1	9 57	6 11	10 16	6 9	7 21	10 1	7 39	11		
F.	6	4 12	1 15	9 0	1 38	8 10	10 37	6 6	11 3	6 3	8 0	9 6	8 23	11		
S.	7	5 6	2 3	8 8	2 30	8 6	11 34	6 0	—	—	8 50	8 11	9 21	11		
S.	8	6 1	2 57	8 5	3 29	8 3	0 10	5 9	0 49	5 8	9 55	8 6	10 34	11		
S.	9	6 55	4 4	8 2	4 43	8 2	1 34	5 7	2 19	5 8	11 15	8 4	11 58	11		
M.	10	7 50	5 25	8 1	6 5	8 2	3 3	5 10	3 40	6 2	—	—	0 39	11		
Tu.	11	8 44	6 45	8 3	7 20	8 5	4 14	6 5	4 41	6 9	1 18	8 11	1 52	11		
W.	12	9 39	7 51	8 8	8 17	8 11	5 5	7 0	5 28	7 4	2 23	9 9	2 48	11		
Th.	13	10 33	8 41	9 3	9 4	9 6	5 51	7 7	6 15	7 10	3 11	10 8	3 32	11		
F.	14	11 28	9 28	9 8	9 51	9 10	6 40	8 0	7 4	8 2	3 54	11 6	4 17	11		
S.	15	morn.	10 13	9 11	10 35	9 11	7 28	8 4	7 49	8 5	4 41	12 0	5 4	11		
S.	16	0 24	10 56	9 11	11 17	9 10	8 9	8 5	8 29	8 4	5 26	12 2	5 47	11		
M.	17	1 21	11 39	9 9	—	—	8 50	8 2	9 11	7 11	6 9	11 11	6 32	11		
Tu.	18	2 17	0 1	9 8	0 24	9 7	9 31	7 8	9 50	7 5	6 54	11 3	7 14	11		
W.	19	3 13	0 46	9 5	1 9	9 3	10 11	7 1	10 33	6 9	7 34	10 4	7 55	11		
Th.	20	4 6	1 33	9 0	1 59	8 10	10 59	6 5	11 30	6 1	8 19	9 5	8 45	11		
F.	21	4 58	2 25	8 7	2 52	8 5	—	—	0 3	5 9	9 15	8 8	9 46	11		
S.	22	5 46	3 20	8 3	3 52	8 1	0 39	5 6	1 19	5 5	10 21	8 2	10 57	11		
S.	23	6 32	4 26	8 0	5 2	7 11	2 0	5 4	2 40	5 4	11 35	7 11	—	11		
M.	24	7 16	5 39	7 10	6 17	7 10	3 17	5 6	3 50	5 9	0 13	8 0	0 51	11		
Tu.	25	7 59	6 50	7 11	7 22	8 0	4 18	5 11	4 44	6 1	1 23	8 3	1 55	11		
W.	26	8 41	7 51	8 2	8 12	8 4	5 7	6 3	5 26	6 5	2 23	8 9	2 44	11		
Th.	27	9 23	8 31	8 6	8 50	8 9	5 43	6 7	6 0	6 9	3 2	9 4	3 20	11		
F.	28	10 6	9 8	8 11	9 25	9 0	6 18	6 11	6 36	7 1	3 35	9 11	3 51	11		
S.	29	10 50	9 41	9 2	9 58	9 3	6 53	7 3	7 11	7 4	4 7	10 5	4 24	11		
S.	30	11 36	10 15	9 4	10 31	9 4	7 29	7 5	7 45	7 6	4 42	10 10	5 0	11		
M.	31	0 25	10 48	9 4	11 4	9 4	8 1	7 7	8 17	7 7	5 17	11 0	5 34	11		
Half Mean Spring Range.			4ft. 9in.				3ft. 10in.				5ft. 7in.					
Phases of the Moon.							Moon's Declination at Noon.									
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°		
First Quarter 8 3 37 Afternoon.							1	7	8.48	9	15	8.40	17	17 N.34	25	5
Full - - - - 15 6 15 Morning.							2	11	24	10	12	16	18	19 10	26	1
Last Quarter - 22 11 27 Morning.							3	14	33	11	8	5	19	19 38	27	2
New - - - - 30 3 28 Afternoon.							4	17	4	12	3	19	20	19 2	28	6
							5	18	49	13	1 N.41	21	17 29	29	10	
In Perigee - - 13 6 0 Afternoon.							6	19	38	14	6	36	22	15 9	30	13
In Apogee - - 25 6 0 Afternoon.							7	19	24	15	11	5	23	12 13	31	16
							8	18	4	16	14	49	24	8 49		

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 2 m. | LONDON DERRY add 4 m. | SLIGO BAY add 3 m.

## OCTOBER, 1864.

GALWAY.										QUEENSTOWN.										WATERFORD.										Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.							
1	4 32	14 4	4 46	14 6	4 57	11 6	5 13	11 7	5 20	12 1	5 34	12 2	0.6																	
2	5 2	14 8	5 18	14 7	5 29	11 8	5 45	11 8	5 50	12 3	6 6	12 3	1.6																	
3	5 35	14 6	5 51	14 5	6 2	11 7	6 18	11 6	6 22	12 3	6 38	12 2	2.6																	
4	6 8	14 3	6 25	14 0	6 34	11 5	6 51	11 3	6 55	12 2	7 12	12 1	3.6																	
5	6 43	13 8	7 2	13 4	7 8	11 0	7 26	10 9	7 28	11 11	7 45	11 9	4.6																	
6	7 24	13 0	7 47	12 7	7 45	10 7	8 5	10 4	8 4	11 6	8 24	11 3	5.6																	
7	8 12	12 1	8 39	11 7	8 26	10 0	8 51	9 9	8 44	11 0	9 5	10 9	6.6																	
8	9 8	11 3	9 43	11 0	9 16	9 6	9 46	9 4	9 32	10 6	10 6	10 3	7.6																	
9	10 23	10 11	11 8	11 0	10 22	9 2	11 6	9 3	10 44	10 1	11 25	10 0	8.6																	
10	11 51	11 4	—	—	11 49	9 4	—	—	—	—	0 3	10 1	9.6																	
1	0 30	11 9	1 4	12 4	0 30	9 7	1 8	10 0	0 41	10 4	1 18	10 9	10.6																	
2	1 34	12 11	2 1	13 7	1 45	10 5	2 16	10 10	1 54	11 2	2 28	11 8	11.6																	
3	2 26	14 2	2 51	14 9	2 44	11 3	3 10	11 8	2 59	12 1	3 27	12 5	12.6																	
4	3 14	15 3	3 37	15 7	3 36	12 0	4 0	12 4	3 55	12 10	4 22	13 0	13.6																	
5	4 0	15 11	4 22	16 1	4 24	12 6	4 47	12 8	4 47	13 2	5 10	13 3	14.6																	
6	4 44	16 2	5 7	16 2	5 11	12 8	5 34	12 8	5 32	13 4	5 54	13 3	15.6																	
7	5 30	15 11	5 53	15 7	5 57	12 6	6 19	12 3	6 16	13 2	6 39	13 0	16.6																	
8	6 14	15 2	6 35	14 8	6 40	12 0	7 0	11 8	7 1	12 9	7 21	12 6	17.6																	
9	6 57	14 1	7 19	13 6	7 21	11 3	7 41	10 11	7 40	12 3	8 0	11 11	18.6																	
10	7 43	12 11	8 8	12 3	8 2	10 6	8 23	10 1	8 20	11 6	8 40	11 1	19.6																	
1	8 34	11 7	9 0	11 0	8 45	9 9	9 8	9 5	9 0	10 9	9 24	10 5	20.6																	
2	9 31	10 7	10 6	10 4	9 34	9 1	10 5	8 10	9 54	10 0	10 27	9 9	21.6																	
3	10 45	10 3	11 25	10 3	10 43	8 9	11 22	8 8	11 3	9 6	11 39	9 5	22.6																	
4	—	—	0 3	10 5	—	—	0 1	8 9	—	—	0 14	9 6	23.6																	
5	0 35	10 8	1 6	11 1	0 36	9 0	1 10	9 2	0 47	9 8	1 19	9 11	24.6																	
6	1 34	11 5	1 56	11 10	1 43	9 5	2 9	9 8	1 52	10 2	2 19	10 5	25.6																	
7	2 16	12 3	2 35	12 7	2 31	9 11	2 53	10 3	2 44	10 9	3 8	11 0	26.6																	
8	2 54	12 11	3 11	13 3	3 12	10 6	3 31	10 9	3 30	11 3	3 50	11 6	27.6																	
9	3 28	13 7	3 45	13 10	3 49	11 0	4 7	11 2	4 10	11 9	4 30	11 10	28.6																	
10	4 2	14 1	4 18	14 3	4 25	11 3	4 43	11 5	4 48	11 11	5 6	12 0	29.6																	
1	4 35	14 5	4 53	14 6	5 1	11 6	5 20	11 6	5 23	12 1	5 40	12 2	30.6																	
Mean Spring Range.					7ft. 5in.					5ft. 10in.					6ft. 2in.															

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
10 29		9	12 49		17	14 41		25	15 53	
10 48		10	13 5		18	14 52		26	15 59	
11 6		11	13 20		19	15 3		27	16 4	
11 24		12	13 35		20	15 13		28	16 9	
11 42		13	13 49		21	15 22		29	16 12	
11 59		14	14 3		22	15 31		30	16 15	
12 16		15	14 16		23	15 39		31	16 17	
12 33		16	14 29		24	15 47				

es of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

NOVEMBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.								DEVONPORT.								PORTSMOUTH.																														
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																										
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.																													
			H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.																														
Tu.	1	1a15	4 21 18	8	4 38 18	7	6 16 15	3	6 34 15	1	—	—	—	—	—	—	—	—	—																														
W.	2	2 8	4 55 18	5	5 13 18	3	6 49 15	2	7 5 14	9	0 38 12	4	0 55 12	—	—	—	—	—	—																														
Th.	3	3 2	5 32 18	0	5 52 17	8	7 23 14	11	7 42 14	4	1 14 12	2	1 33 12	—	—	—	—	—	—																														
F.	4	3 57	6 13 17	3	6 35 16	9	8 2 14	7	8 22 14	6	1 53 11	11	2 14 11	—	—	—	—	—	—																														
S.	5	4 51	7 1 16	2	7 29 15	8	8 43 14	1	9 9 13	3	2 36 11	7	3 1 11	—	—	—	—	—	—																														
S.	6	5 44	7 57 15	2	8 29 14	9	9 37 13	7	10 5 12	8	3 27 11	2	3 54 10	—	—	—	—	—	—																														
M.	7	6 37	9 5 14	7	9 42 14	8	10 37 13	2	11 15 12	5	4 25 10	9	4 59 10	—	—	—	—	—	—																														
Tu.	8	7 29	10 24 14	10	11 4 15	3	11 55 13	2	—	—	5 35 10	6	6 13 10	—	—	—	—	—	—																														
W.	9	8 21	11 41 15	8	—	—	0 37 12	9	1 17 13	9	6 52 10	9	7 28 11	—	—	—	—	—	—																														
Th.	10	9 14	0 14 16	3	0 45 16	11	1 54 13	7	2 27 14	6	8 4 11	5	8 36 11	—	—	—	—	—	—																														
F.	11	10 8	1 13 17	8	1 38 18	3	2 59 14	7	3 26 15	3	9 5 12	2	9 32 12	—	—	—	—	—	—																														
S.	12	11 4	2 3 18	10	2 26 19	4	3 53 15	2	4 20 15	7	9 58 12	8	10 22 12	—	—	—	—	—	—																														
S.	13	12 0	2 49 19	9	3 12 19	11	4 45 15	9	5 9 15	11	10 45 12	11	11 9 13	—	—	—	—	—	—																														
M.	14	morn.	3 35 19	11	3 58 19	10	5 32 15	11	5 55 15	11	11 31 13	1	11 54 13	—	—	—	—	—	—																														
Tu.	15	0 57	4 21 19	7	4 41 19	4	6 17 16	0	6 39 15	8	—	—	0 18 12	—	—	—	—	—	—																														
W.	16	1 53	5 1 18	11	5 21 18	6	6 58 15	8	7 15 15	1	0 41 12	9	1 2 12	—	—	—	—	—	—																														
Th.	17	2 46	5 41 18	0	6 3 17	6	7 33 15	3	7 52 14	4	1 23 12	4	1 43 12	—	—	—	—	—	—																														
F.	18	3 37	6 24 16	10	6 45 16	2	8 12 14	6	8 30 13	6	2 4 11	10	2 25 11	—	—	—	—	—	—																														
S.	19	4 25	7 7 15	7	7 30 14	11	8 48 13	9	9 8 12	8	2 46 11	4	3 8 11	—	—	—	—	—	—																														
S.	20	5 11	7 54 14	4	8 20 13	11	9 29 12	11	9 53 11	11	3 28 10	9	3 51 10	—	—	—	—	—	—																														
M.	21	5 54	8 46 13	7	9 19 13	5	10 19 12	4	10 47 11	6	4 16 10	3	4 42 10	—	—	—	—	—	—																														
Tu.	22	6 36	9 54 13	4	10 29 13	4	11 18 12	0	11 53 11	6	5 13 9	11	5 45 9	—	—	—	—	—	—																														
W.	23	7 18	11 4 13	7	11 38 13	10	—	—	0 28 12	2	6 18 9	9	6 53 9	—	—	—	—	—	—																														
Th.	24	8 0	—	—	0 9 14	2	1 3 12	1	1 37 12	9	7 25 10	1	7 57 10	—	—	—	—	—	—																														
F.	25	8 44	0 36 14	7	1 2 15	1	2 10 12	9	2 38 13	3	8 27 10	7	8 53 10	—	—	—	—	—	—																														
S.	26	9 29	1 25 15	7	1 46 16	2	3 4 13	5	3 28 13	9	9 17 11	2	9 40 11	—	—	—	—	—	—																														
S.	27	10 17	2 6 16	8	2 25 17	2	3 52 14	0	4 14 14	3	10 1 11	7	10 21 11	—	—	—	—	—	—																														
M.	28	11 7	2 44 17	8	3 4 18	1	4 36 14	7	4 57 14	8	10 40 12	0	10 59 12	—	—	—	—	—	—																														
Tu.	29	12 0	3 23 18	4	3 41 18	6	5 17 15	0	5 36 15	0	11 19 12	3	11 37 12	—	—	—	—	—	—																														
W.	30	0a55	4 2 18	8	4 22 18	9	5 56 15	4	6 16 15	11	11 58 12	5	—	—	—	—	—	—	—																														
Half Mean Spring Range.			9ft. 6in.								7ft. 9in.								6ft. 4in.																														
Phases of the Moon.																									Moon's Declination at Noon.																								
D. H. M.																									M.D. ° ' "																								
First Quarter- 6 11 53 Afternoon.																									1 18 S. 27 9 0 S. 3 17 18 N. 11 25 9 S. 13																								
Full - - - - 13 5 33 Afternoon.																									2 19 30 10 4 N. 46 18 16 5 26 12 41																								
Last Quarter- 21 7 17 Morning.																									3 19 30 11 9 21 19 13 18 27 15 39																								
New - - - - 29 7 17 Morning.																									4 18 25 12 13 21 20 10 0 28 17 56																								
In Perigee - - 10 6 0 Afternoon.																									5 16 17 13 16 31 21 6 21 29 19 19																								
In Apogee - - 22 1 0 Afternoon.																									6 13 11 14 18 37 22 2 29 30 19 39																								
																									7 9 18 15 19 35 23 1 S. 30																								
																									8 4 50 16 19 24 24 5 26																								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 4 m.



## OCTOBER, 1864.

MONTH. DAY.	GALWAY.								QUEENSTOWN.								WATERFORD.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	D.						
1	4 32 14 4	4 46 14 6	4 57 11 6	5 13 11 7	5 20 12 1	5 34 12 2	0'6																		
2	5 2 14 8	5 18 14 7	5 29 11 8	5 45 11 8	5 50 12 3	6 6 12 3	1'6																		
3	5 35 14 6	5 51 14 5	6 2 11 7	6 18 11 6	6 22 12 3	6 38 12 2	2'6																		
4	6 8 14 3	6 25 14 0	6 34 11 5	6 51 11 3	6 55 12 2	7 12 12 1	3'6																		
5	6 43 13 8	7 2 13 4	7 8 11 0	7 26 10 9	7 28 11 11	7 45 11 9	4'6																		
6	7 24 13 0	7 47 12 7	7 45 10 7	8 5 10 4	8 4 11 6	8 24 11 3	5'6																		
7	8 12 12 1	8 39 11 7	8 26 10 0	8 51 9 9	8 44 11 0	9 5 10 9	6'6																		
8	9 8 11 3	9 43 11 0	9 16 9 6	9 46 9 4	9 32 10 6	10 6 10 3	7																		
9	10 23 10 11	11 8 11 0	10 22 9 2	11 6 9 3	10 44 10 1	11 25 10 0	8'6																		
10	11 51 11 4	—	11 49 9 4	—	—	—	9'6																		
11	0 30 11 9	1 4 12 4	0 30 9 7	1 8 10 0	0 41 10 4	1 18 10 9	10'6																		
12	1 34 12 11	2 1 13 7	1 45 10 5	2 16 10 10	1 54 11 2	2 28 11 8	11'6																		
13	2 26 14 2	2 51 14 9	2 44 11 3	3 10 11 8	2 59 12 1	3 27 12 5	12'6																		
14	3 14 15 3	3 37 15 7	3 36 12 0	4 0 12 4	3 55 12 10	4 22 13 0	13'6																		
15	4 0 15 11	4 22 16 1	4 24 12 6	4 47 12 8	4 47 13 2	5 10 13 3	14'6																		
16	4 44 16 2	5 7 16 2	5 11 12 8	5 34 12 8	5 32 13 4	5 54 13 3	15'6																		
17	5 30 15 11	5 53 15 7	5 57 12 6	6 19 12 3	6 16 13 2	6 39 13 0	16'6																		
18	6 14 15 2	6 35 14 8	6 40 12 0	7 0 11 8	7 1 12 9	7 21 12 6	17'6																		
19	6 57 14 1	7 19 13 6	7 21 11 3	7 41 10 11	7 40 12 3	8 0 11 11	18'6																		
20	7 43 12 11	8 8 12 3	8 2 10 6	8 23 10 1	8 20 11 6	8 40 11 1	19'6																		
21	8 34 11 7	9 0 11 0	8 45 9 9	9 8 9 5	9 0 10 9	9 24 10 5	20'6																		
22	9 31 10 7	10 6 10 4	9 34 9 1	10 5 8 10	9 54 10 0	10 27 9 9	21'6																		
23	10 45 10 3	11 25 10 3	10 43 8 9	11 22 8 8	11 3 9 6	11 39 9 5	22'6																		
24	—	0 3 10 5	—	0 1 8 9	—	0 14 9 6	23'6																		
25	0 35 10 8	1 6 11 1	0 36 9 0	1 10 9 2	0 47 9 8	1 19 9 11	24'6																		
26	1 34 11 5	1 56 11 10	1 43 9 5	2 9 9 8	1 52 10 2	2 19 10 5	25'6																		
27	2 16 12 3	2 35 12 7	2 31 9 11	2 53 10 3	2 44 10 9	3 8 11 0	26'6																		
28	2 54 12 11	3 11 13 3	3 12 10 6	3 31 10 9	3 30 11 3	3 50 11 6	27'6																		
29	3 28 13 7	3 45 13 10	3 49 11 0	4 7 11 2	4 10 11 9	4 30 11 10	28'6																		
30	4 2 14 1	4 18 14 3	4 25 11 3	4 43 11 5	4 48 11 11	5 6 12 0	29'6																		
31	4 35 14 5	4 53 14 6	5 1 11 6	5 20 11 6	5 23 12 1	5 40 12 2	30'9																		
If Mean Spring } Range. }								5ft 10in.								6ft. 2in.									

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
10 29	Add.	9	12 49	Add.	17	14 41	Add.	25	15 53	Add.
10 48		10	13 5		18	14 52		26	15 59	
11 6		11	13 20		19	15 3		27	16 4	
11 24		12	13 35		20	15 13		28	16 9	
11 42		13	13 49		21	15 22		29	16 12	
11 59		14	14 3		22	15 31		30	16 15	
12 16		15	14 16		23	15 39		31	16 17	
12 33		16	14 29		24	15 47				

Meas of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.  
 F

## NOVEMBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.												
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTER.								
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.													
		H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.															
Tu.	1	1a15	0 30	11 5	0 48	11 5	7 7	20 6	7 26	20 6	3 57	14 2	4 15																		
W.	2	2 8	1 6	11 4	1 24	11 3	7 43	20 5	7 59	20 4	4 33	14 1	4 49																		
Th.	3	3 2	1 41	11 2	2 0	11 1	8 18	20 2	8 37	19 10	5 8	13 9	5 28																		
F.	4	3 57	2 20	11 0	2 40	10 10	8 58	19 6	9 19	19 1	5 49	13 3	6 11																		
S.	5	4 51	3 1	10 8	3 22	10 6	9 40	18 9	10 7	18 3	6 35	12 8	7 3																		
Sh.	6	5 44	3 47	10 4	4 13	10 3	10 37	17 11	11 11	17 6	7 31	12 1	8 2																		
M.	7	6 37	4 43	10 1	5 15	10 0	11 49	17 3	—	—	8 36	11 8	9 15																		
Tu.	8	7 29	5 51	10 0	6 30	10 0	0 29	17 0	1 4	17 1	9 54	11 6	10 32																		
W.	9	8 21	7 13	10 2	7 51	10 4	1 40	17 3	2 15	17 9	11 8	11 11	11 40																		
Th.	10	9 14	8 26	10 7	8 58	10 10	2 48	18 4	3 19	19 0	—	—	0 10																		
F.	11	10 8	9 28	11 1	9 57	11 4	3 49	19 7	4 16	20 2	0 39	13 2	1 6																		
S.	12	11 4	10 22	11 6	10 47	11 9	4 40	20 7	5 4	21 0	1 33	13 11	1 59																		
Sh.	13	12 0	11 12	11 11	11 36	12 0	5 27	21 3	5 52	21 5	2 24	14 6	2 47																		
M.	14	morn.	11 59	12 0	—	—	6 17	21 7	6 39	21 7	3 9	14 9	3 31																		
Tu.	15	0 57	0 20	11 11	0 42	11 10	7 1	21 6	7 24	21 4	3 53	14 10	4 15																		
W.	16	1 53	1 5	11 9	1 27	11 7	7 46	21 1	8 6	20 9	4 36	14 7	4 56																		
Th.	17	2 46	1 47	11 4	2 8	11 2	8 26	20 4	8 46	19 10	5 16	13 11	5 37																		
F.	18	3 37	2 29	11 0	2 51	10 9	9 8	19 4	9 30	18 9	6 0	13 1	6 23																		
S.	19	4 25	3 12	10 6	3 33	10 4	9 51	18 3	10 14	17 9	6 47	12 4	7 10																		
Sh.	20	5 11	3 54	10 2	4 16	9 11	10 39	17 3	11 8	16 10	7 34	11 8	7 59																		
M.	21	5 54	4 40	9 9	5 5	9 8	11 39	16 5	—	—	8 27	11 1	8 56																		
Tu.	22	6 36	5 32	9 7	6 5	9 6	0 11	16 1	0 43	16 0	9 30	10 9	10 51																		
W.	23	7 18	6 43	9 6	7 18	9 7	1 14	15 11	1 45	16 0	10 37	10 9	11 9																		
Th.	24	8 0	7 52	9 9	8 23	9 11	2 16	16 3	2 45	16 8	11 38	11 1	—																		
F.	25	8 44	8 53	10 0	9 19	10 2	3 14	17 1	3 41	17 6	0 6	11 5	0 31																		
S.	26	9 29	9 45	10 5	10 8	10 7	4 5	18 0	4 28	18 5	0 55	12 0	1 18																		
Sh.	27	10 17	10 30	10 9	10 50	10 11	4 48	18 10	5 7	19 2	1 41	12 8	2 21																		
M.	28	11 7	11 10	11 1	11 30	11 3	5 26	19 6	5 46	19 9	2 22	13 2	2 42																		
Tu.	29	12 0	11 50	11 4	—	—	6 6	20 0	6 26	20 2	3 1	13 7	3 19																		
W.	30	0a55	0 10	11 5	0 27	11 5	6 45	20 4	7 5	20 6	3 38	14 0	3 57																		
Half Mean Spring } Range.			5 ft. 9 in.								10 ft. 5 in.								7 ft. 2 in.												
Phases of the Moon.																Moon's Declination at Noon.															
D. H. M.																M.D. ° ' "															
First Quarter 6 11 53 Afternoon.																1 18 s. 27 9 0 s. 3 17 18 N. 11 25 9															
Full - - - 13 5 33 Afternoon.																2 19 30 10 4 N. 46 18 16 5 26 12															
Last Quarter 21 7 17 Morning.																3 19 30 11 9 21 19 13 18 27 15															
New - - - 29 7 17 Morning.																4 18 25 12 13 21 20 10 0 28 17															
In Perigee - 10 6 0 Afternoon.																5 16 17 13 16 31 21 6 21 29 19															
In Apogee - 22 1 0 Afternoon.																6 13 11 14 18 37 22 2 29 30 19															
																7 9 18 15 19 35 23 1 s. 30															
																8 4 50 16 19 24 24 5 26															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.

## NOVEMBER, 1864.

DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	
53 18 4	—	—	—	1 17 15 11	1 35 15 11	2 47 18 10	3 3 18 11	1'9				
12 18 4	0 31 18 3	1 52 15 10	2 9 15 9	3 21 18 11	3 38 18 11	2'9						
51 18 1	1 12 17 11	2 25 15 8	2 43 15 7	3 56 18 10	4 14 18 9	3'9						
33 17 9	1 54 17 6	3 2 15 5	3 22 15 2	4 34 18 6	4 52 18 4	4'9						
17 17 1	2 42 16 9	3 43 14 11	4 5 14 8	5 14 18 1	5 37 17 10	5'9						
8 16 4	3 35 15 11	4 31 14 4	4 59 14 1	6 1 17 6	6 30 17 2	6						
4 15 7	4 36 15 3	5 30 13 10	6 4 13 7	6 58 16 11	7 31 16 8	7'9						
8 15 2	5 43 15 3	6 44 13 6	7 24 13 7	8 10 16 6	8 51 16 6	8'9						
18 15 7	6 54 16 1	8 5 13 9	8 43 14 1	9 31 16 7	10 8 16 9	9'9						
29 16 8	8 1 17 2	9 19 14 5	9 51 14 10	10 46 17 0	11 20 17 4	10'9						
28 17 8	8 55 18 2	10 20 15 3	10 47 15 7	11 49 17 9	—	11'9						
21 18 7	9 47 18 11	11 11 15 10	11 35 16 2	0 16 18 2	0 41 18 6	12'9						
13 19 1	10 38 19 3	11 59 16 4	—	1 7 18 10	1 30 19 2	0						
4 19 4	11 28 19 3	0 22 16 6	0 46 16 7	1 54 19 4	2 17 19 6	14'9						
52 19 1	—	1 8 16 8	1 30 16 6	2 38 19 7	3 0 19 7	15'9						
15 18 11	0 37 18 8	1 52 16 5	2 13 16 3	3 21 19 6	3 42 19 4	16'9						
0 18 4	1 22 18 0	2 32 16 0	2 51 15 9	4 2 19 2	4 23 18 11	17'9						
44 17 7	2 6 17 2	3 11 15 5	3 32 15 1	4 42 18 7	5 3 18 3	18'9						
28 16 8	2 49 16 2	3 54 14 9	4 16 14 4	5 25 17 10	5 47 17 6	19'9						
10 15 9	3 32 15 3	4 38 14 0	5 2 13 8	6 9 17 1	6 31 16 9	20'9						
56 14 10	4 20 14 6	5 27 13 4	5 55 13 1	6 54 16 5	7 21 16 2	21'9						
48 14 3	5 17 14 1	6 25 12 11	6 59 12 10	7 52 15 11	8 28 15 9	22'9						
48 14 0	6 19 14 3	7 36 12 10	8 10 12 11	9 1 15 8	9 34 15 7	23'9						
51 14 7	7 23 14 11	8 44 13 2	9 16 13 4	10 7 15 9	10 38 15 10	24'9						
7 52 15 3	8 17 15 8	9 46 13 7	10 12 13 11	11 12 16 0	11 40 16 4	25'9						
3 40 16 1	9 3 16 6	10 36 14 2	10 59 14 5	—	0 6 16 7	26'9						
2 24 16 10	9 45 17 2	11 19 14 9	11 39 15 0	0 28 16 11	0 50 17 3	27'9						
0 6 17 6	10 27 17 9	11 58 15 2	—	1 9 17 6	1 28 17 10	28'9						
0 49 18 0	11 10 18 2	0 17 15 5	0 36 15 7	1 48 18 1	2 6 18 4	29'9						
1 31 18 4	11 53 18 4	0 56 15 9	1 13 15 10	2 27 18 7	2 46 18 9	30'9						
Mean Spring Range.		9ft. 4in.		8ft. 0in.		9ft. 7in.						

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
6 18	Add.	9	15 59	Add.	17	14 47	Add.	25	12 41	Add.
6 19		10	15 53		18	14 34		26	12 22	
6 18		11	15 46		19	14 20		27	12 2	
6 17		12	15 38		20	14 6		28	11 41	
6 15		13	15 30		21	13 50		29	11 20	
6 12		14	15 20		22	13 34		30	10 58	
6 9		15	15 10		23	13 17				
6 4		16	14 59		24	13 0				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m.      SHEERNESS subtract 3 m.      LONDON 0 m.



## NOVEMBER, 1864.

WEEK DAY.			MONTH DAY.			MOON'S TRANSIT.			GREENOCK.								LIVERPOOL.								PEMBROKE.																																								
									MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																																				
									Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.																																		
									H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.																																	
Tu.	1	1	1	1	1	5	0	27	9	7	0	46	9	7	11	57	25	6	—	—	6	47	20	7	7	4	20	6	—	—	—	—																																	
W.	2	2	2	2	2	8	1	4	9	7	1	21	9	7	0	15	25	5	0	32	25	4	7	20	20	4	7	40	20	—	—	—	—																																
Th.	3	3	3	3	3	2	1	39	9	6	1	58	9	5	0	50	25	1	1	9	24	8	8	0	19	11	8	20	19	7	—	—	—																																
F.	4	4	4	4	4	57	2	19	9	5	2	39	9	4	1	28	24	3	1	49	23	9	8	41	19	2	9	2	18	8	—	—	—																																
S.	5	5	5	5	5	4	3	0	9	2	3	24	9	1	2	10	23	3	2	35	22	9	9	25	18	3	9	49	17	10	—	—	—																																
S.	6	6	6	6	6	44	3	51	9	0	4	19	8	10	3	22	3	3	30	21	8	10	15	17	4	10	41	16	10	—	—	—																																	
M.	7	7	7	7	7	37	4	49	8	9	5	24	8	7	4	42	3	4	43	21	0	11	12	16	6	11	44	16	6	—	—	—																																	
Tu.	8	8	8	8	8	29	6	1	8	6	6	39	8	6	5	23	21	1	6	8	21	5	—	—	—	0	20	16	7	—	—	—																																	
W.	9	9	9	9	9	21	7	17	8	8	7	53	8	10	6	47	21	11	7	22	22	6	1	2	16	11	1	42	17	5	—	—	—																																
Th.	10	10	10	10	10	14	8	26	9	0	8	58	9	3	7	55	23	3	8	23	24	0	2	19	18	1	2	53	18	10	—	—	—																																
F.	11	11	11	11	11	8	9	26	9	5	9	53	9	6	8	49	24	9	9	13	25	4	3	23	19	7	3	52	20	2	—	—	—																																
S.	12	12	12	12	12	4	10	19	9	8	10	45	9	9	9	37	25	11	10	0	26	4	4	21	20	9	4	48	21	2	—	—	—																																
S.	13	13	13	13	13	0	11	10	9	10	11	35	9	11	10	24	26	6	10	48	26	9	5	15	21	5	5	40	21	8	—	—	—																																
M.	14	14	14	14	14	morn.	11	59	9	11	—	—	—	11	11	26	10	11	33	26	9	6	22	21	9	6	24	21	9	—	—	—	—																																
Tu.	15	15	15	15	15	0	57	0	22	9	11	0	45	9	11	11	56	26	7	—	—	6	46	21	7	7	7	21	3	—	—	—	—																																
W.	16	16	16	16	16	1	53	1	7	9	10	1	28	9	9	0	18	26	4	0	38	25	11	7	27	20	10	7	48	20	5	—	—	—																															
Th.	17	17	17	17	17	2	46	1	48	9	8	2	8	9	6	0	58	25	4	1	18	24	8	8	9	19	11	8	31	19	4	—	—	—																															
F.	18	18	18	18	18	3	37	2	29	9	4	2	49	9	2	1	39	24	0	2	0	23	4	8	52	18	9	9	12	18	2	—	—	—																															
S.	19	19	19	19	19	4	25	3	10	9	0	3	31	8	11	2	21	22	8	2	42	22	1	9	31	17	7	9	50	17	—	—	—																																
S.	20	20	20	20	20	5	11	3	53	8	9	4	16	8	7	3	42	21	4	3	27	20	9	10	12	16	6	10	34	16	0	—	—	—																															
M.	21	21	21	21	21	5	54	4	40	8	6	5	7	8	4	3	55	20	3	4	24	19	10	10	56	15	6	11	24	15	3	—	—	—																															
Tu.	22	22	22	22	22	6	36	5	39	8	3	6	12	8	1	4	59	19	8	5	36	19	7	11	54	15	1	—	—	—	—	—	—																																
W.	23	23	23	23	23	7	18	6	45	8	0	7	18	8	1	6	13	19	8	6	48	20	0	0	26	15	1	1	2	15	3	—	—	—																															
Th.	24	24	24	24	24	8	0	7	50	8	3	8	21	8	4	7	19	20	4	7	49	20	10	1	39	15	6	2	12	15	17	—	—	—																															
F.	25	25	25	25	25	8	44	8	49	8	6	9	15	8	7	8	16	21	4	8	39	21	11	2	42	16	5	3	10	16	18	—	—	—																															
S.	26	26	26	26	26	9	29	9	38	8	9	10	1	8	11	9	122	6	9	21	23	0	3	35	17	6	4	0	18	1	—	—	—																																
S.	27	27	27	27	27	10	17	10	22	9	0	10	42	9	1	9	41	23	6	9	59	24	0	4	23	18	7	4	46	19	0	—	—	—																															
M.	28	28	28	28	28	11	7	11	3	9	2	11	24	9	3	10	18	24	4	10	38	24	8	5	8	19	5	5	29	19	9	—	—	—																															
Tu.	29	29	29	29	29	12	0	11	45	9	5	—	—	—	10	58	25	0	11	17	25	3	5	50	20	1	6	9	20	4	—	—	—																																
W.	30	30	30	30	30	0	55	0	5	9	6	0	25	9	7	11	37	25	6	11	57	25	7	6	28	20	7	6	49	20	8	—	—	—																															
Half Mean Spring Range.									4 ft. 10 in.									13 ft. 0 in.									10 ft. 6 in.																																						
Phases of the Moon.																																	Moon's Declination at Noon.																																
D H. M.																																	M.D. ° ' "																																
First Quarter - 6 11 53 Afternoon.																																	1 18 S. 27 9 0 S. 3 17 18 N. 11 25 9 S. 13																																
Full - - - - 13 5 33 Afternoon.																																	2 19 30 10 4 N. 46 18 16 5 26 12 41																																
Last Quarter - 21 7 17 Morning.																																	3 19 30 11 9 21 19 13 18 27 15 39																																
New - - - - 29 7 17 Morning.																																	4 18 25 12 13 21 20 10 0 28 17 56																																
																																	5 16 17 13 16 31 21 6 21 29 19 19																																
In Perigee - - 10 6 0 Afternoon.																																	6 13 11 14 18 37 22 2 29 30 19 39																																
In Apogee - - 22 1 0 Afternoon.																																	7 9 18 15 19 35 23 18 30 29 19 39																																
																																	8 4 50 16 19 24 24 5 26 29 19 39																																

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

## NOVEMBER, 1864.

WEEK DAY.	MONTH DAY.	NORTH SHIELDS.				LEITH.				THURSO.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
		H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.		H. M. F. I.		D.
Tu.	1	3 59	13 0	4 17	12 11	2 55	16 0	3 12	15 11	9 1	12 11	9 19	12 10	1.9
W.	2	4 35	12 10	4 52	12 8	3 30	15 10	3 47	15 8	9 37	12 8	9 56	12 6	2.9
Th.	3	5 11	12 6	5 32	12 4	4 6	15 6	4 27	15 3	10 17	12 3	10 38	11 11	3.9
F.	4	5 53	12 2	6 14	11 11	4 47	15 1	5 9	14 10	11 1	11 7	11 25	11 4	4.9
S.	5	6 37	11 8	7 5	11 4	5 33	14 6	6 14	2 11	53	11 0	—	—	5.9
S.	6	7 35	11 0	8 8	10 8	6 30	13 10	7 3	13 6	0 22	10 8	0 54	10 5	6.9
M.	7	8 45	10 5	9 26	10 4	7 39	13 3	8 19	13 1	1 30	10 2	2 10	10 1	7.9
Tu.	8	10 6	10 6	10 44	10 8	8 59	13 2	9 39	13 4	2 52	10 1	3 37	10 2	8.9
W.	9	11 21	11 0	11 54	11 4	10 14	13 8	10 47	14 0	4 14	10 5	4 49	10 8	9.9
Th.	10	—	—	0 23	11 8	11 17	14 5	11 45	14 10	5 19	11 1	5 47	11 6	10.9
F.	11	0 51	12 0	1 15	12 5	—	—	0 9	15 3	6 10	12 1	6 31	12 7	11.9
S.	12	1 39	12 9	2 3	13 1	0 33	15 8	0 58	16 2	6 52	13 0	7 13	13 5	12.9
S.	13	2 25	13 4	2 47	13 7	1 22	16 6	1 45	16 9	7 34	13 9	7 56	13 11	13.9
M.	14	3 9	13 8	3 31	13 9	2 8	16 11	2 29	16 11	8 17	13 11	8 38	13 9	14.9
Tu.	15	3 53	13 9	4 16	13 7	2 50	16 10	3 11	16 7	9 0	13 7	9 22	13 4	15.9
W.	16	4 38	13 3	4 59	12 11	3 32	16 4	3 53	16 0	9 43	13 0	10 5	12 8	16.9
Th.	17	5 20	12 8	5 41	12 4	4 15	15 8	4 36	15 4	10 26	12 2	10 49	11 9	17.9
F.	18	6 3	12 0	6 25	11 8	4 58	14 11	5 21	14 7	11 13	11 4	11 37	10 11	18.9
S.	19	6 48	11 4	7 12	10 11	5 45	14 2	6 9	13 8	12 0	10 6	—	—	19.9
S.	20	7 38	10 6	8 5	10 2	6 33	13 3	7 0	12 11	0 25	10 2	0 51	9 10	20.9
M.	21	8 35	9 11	9 6	9 9	7 30	12 8	8 0	12 5	1 20	9 7	1 51	9 4	21.9
Tu.	22	9 43	9 8	10 17	9 8	8 35	12 4	9 11	12 3	2 27	9 3	3 5	9 2	22.9
W.	23	10 50	9 9	11 22	9 11	9 44	12 4	10 15	12 6	3 42	9 2	4 15	9 3	23.9
Th.	24	11 52	10 2	—	—	10 45	12 8	11 13	12 11	4 46	9 5	5 15	9 7	24.9
F.	25	0 20	10 4	0 44	10 7	11 37	13 3	—	—	5 40	9 11	6 3	10 3	25.9
S.	26	1 7	10 10	1 28	11 2	0 1	13 6	0 22	13 11	6 23	10 8	6 41	11 1	26.9
S.	27	1 47	11 5	2 6	11 9	0 42	14 3	1 14	14 8	6 58	11 6	7 14	11 11	27.9
M.	28	2 25	12 0	2 43	12 3	1 21	15 0	1 40	15 4	7 31	12 3	7 47	12 7	28.9
Tu.	29	3 12	6	3 20	12 9	1 59	15 7	2 19	15 10	8 6	12 10	8 23	12 11	29.9
W.	30	3 37	12 10	3 57	12 11	2 36	15 11	2 54	16 0	8 42	13 0	9 2	13 0	30.9
Half Mean Spring Range.		6ft. 8in.				8ft. 2in.				6ft. 7in.				

## Equation of Time at Noon.

M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
1	16 18	Add.	9	15 59	Add.	17	14 47	Add.	25	12 41	Add.
2	16 19		10	15 53		18	14 34		26	12 22	
3	16 18		11	15 46		19	14 20		27	12 2	
4	16 17		12	15 38		20	14 6		28	11 41	
5	16 15		13	15 30		21	13 50		29	11 20	
6	16 12		14	15 22		22	13 34		30	10 58	
7	16 9		15	15 10		23	13 17				
8	16 4		16	14 59		24	13 0				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.

# TIDE TABLES FOR THE

NOVEMBER, 1864.

WEEK DAY.			MONTH DAY.			MOON'S TRANSIT.			BELFAST.						LONDONDERRY.						SLIGO BAY.																																						
									MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																																			
									Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.																																
									H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.																															
Tu.	1	18 15	11	21	9	4	11	38	9	3	8	33	7	6	8	49	7	5	5	51	11	0	6	8																																			
W.	2	2 8	11	56	9	3	—	—	—	—	9	5	7	4	9	23	7	2	6	26	10	9	6	45																																			
Th.	3	3 2	0	16	9	3	0	37	9	2	9	41	7	1	10	1	6	11	7	5	10	4	7	25																																			
F.	4	3 57	0	59	9	1	1	22	9	0	10	22	6	9	10	47	6	6	7	45	9	9	8	8																																			
S.	5	4 51	1	48	8	10	2	17	8	9	11	19	6	4	11	54	6	1	8	36	9	3	9	8																																			
S.	6	5 44	2	46	8	7	3	17	8	5	—	—	—	—	0	34	5	11	9	42	8	10	10	20																																			
M.	7	6 37	3	51	8	4	4	30	8	4	1	16	5	10	2	3	5	10	11	1	8	8	11	39																																			
Tu.	8	7 29	5	6	8	4	5	42	8	4	2	43	6	0	3	20	6	3	—	—	—	—	—	0	16																																		
W.	9	8 21	6	19	8	4	6	54	8	5	3	52	6	6	4	19	6	9	0	53	9	1	1	27																																			
Th.	10	9 14	7	25	8	7	7	53	8	10	4	44	7	0	5	7	7	2	1	58	9	8	2	25																																			
F.	11	10 8	8	18	9	1	8	43	9	3	5	30	7	5	5	53	7	7	2	49	10	4	3	12																																			
S.	12	11 4	9	7	9	5	9	31	9	7	6	18	7	9	6	43	7	10	3	34	11	0	3	57																																			
S.	13	12 0	9	54	9	8	10	17	9	8	7	7	7	11	7	30	8	0	4	20	11	5	4	44																																			
M.	14	morn.	10	39	9	8	11	0	9	8	7	52	8	0	8	13	8	0	5	8	11	8	5	30																																			
Tu.	15	0 57	11	21	9	7	11	42	9	6	8	33	7	11	8	53	7	9	5	51	11	6	6	11																																			
W.	16	1 53	—	—	—	—	0	3	9	5	9	12	7	6	9	31	7	3	6	32	11	0	6	53																																			
Th.	17	2 46	0	25	9	3	0	47	9	2	9	50	7	0	10	11	6	10	7	14	10	3	7	36																																			
F.	18	3 37	1	11	9	0	1	34	8	11	10	33	6	7	10	59	6	4	7	57	9	7	8	19																																			
S.	19	4 25	1	59	8	9	2	23	8	7	11	27	6	0	11	57	5	9	8	43	9	0	9	10																																			
S.	20	5 11	2	48	8	5	3	14	8	3	—	—	—	—	0	30	5	7	9	39	8	5	10	10																																			
M.	21	5 54	3	42	8	2	4	11	8	1	1	5	5	6	1	42	5	5	10	42	8	2	11	16																																			
Tu.	22	6 36	4	44	8	0	5	16	7	11	1	20	5	5	2	54	5	7	11	49	8	2	—	—																																			
W.	23	7 18	5	48	7	11	6	20	7	11	3	25	5	9	3	53	5	11	0	21	8	2	0	54																																			
Th.	24	8 0	6	51	8	0	7	21	8	1	4	19	6	1	4	43	6	2	1	24	8	5	1	53																																			
F.	25	8 44	7	46	8	2	8	9	8	4	5	3	6	4	5	23	6	6	2	19	8	10	2	41																																			
S.	26	9 29	8	31	8	7	8	51	8	9	5	42	6	7	6	1	6	9	3	2	9	4	3	21																																			
S.	27	10 17	9	11	8	11	9	30	9	0	6	21	6	11	6	41	7	1	3	38	9	11	3	56																																			
M.	28	11 7	9	49	9	2	10	8	9	3	7	1	7	2	7	21	7	3	4	15	10	5	4	34																																			
Tu.	29	12 0	10	27	9	3	10	45	9	3	7	41	7	5	7	58	7	6	4	54	10	10	5	14																																			
W.	30	oa 55	11	4	9	4	11	23	9	4	8	17	7	7	8	35	7	8	5	34	11	0	5	53																																			
Half Moon Spring } Range.									4 ft. 9 in.									3 ft. 10 in.									5 ft. 7 in.																																
Phases of the Moon.															Moon's Declination at Noon.																																												
D. H. M.															M.D. ° ' "															M.D. ° ' "															M.D. ° ' "														
First Quarter 6 11 53 Afternoon.															1 18 s. 27 9 0 s. 3 17 18 N. 11 25 9															2 19 30 10 4 N. 46 18 16 5 26 12															3 19 30 11 9 21 19 13 18 27 15														
Full - - - - 13 5 33 Afternoon.															4 18 25 12 13 21 20 10 0 28 17															5 16 17 13 16 31 21 6 21 29 19															6 13 11 14 18 37 22 2 29 30 19														
Last Quarter - 21 7 17 Morning.															7 9 18 15 19 35 23 1 s. 30															8 4 50 16 19 24 24 5 26																													
New - - - - 29 7 17 Morning.																																																											
In Perigee - - 10 6 0 Afternoon.																																																											
In Apogee - - 22 1 0 Afternoon.																																																											

## NOVEMBER, 1864.

GALWAY.												QUEENSTOWN.												WATERFORD.												C's Age at Noon.
MORNING.						AFTERNOON.						MORNING.						AFTERNOON.						MORNING.						AFTERNOON.						
Time.		Height.				Time.		Height.				Time.		Height.				Time.		Height.				Time.		Height.				Time.		Height.				
H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	D.				
11	14	6		5	29	14	5	5	38	11	6	5	56	11	6	5	59	12	2	6	17	12	2	1	9							1	9			
47	14	4		6	6	14	2	6	13	11	5	6	32	11	4	6	34	12	2	6	53	12	1	2	9							2	9			
26	13	11		6	47	13	8	6	51	11	2	7	11	11	0	7	12	12	0	7	32	11	11	3	9							3	9			
8	13	4		7	32	13	0	7	32	10	9	7	53	10	7	7	51	11	9	8	11	11	7	4	9							4	9			
59	12	7		8	27	12	2	8	15	10	4	8	40	10	1	8	33	11	4	8	55	11	1	5	9							5	9			
57	11	9		9	30	11	6	9	7	9	10	9	35	9	8	9	21	10	11	9	53	10	8									9				
8	11	5		10	47	11	6	10	9	9	7	10	46	9	7	10	31	10	5	11	7	10	4	7	9								7	9		
28	11	9		—	—	—	11	25	9	8	—	—	—	—	—	11	42	10	4	—	—	—	—	8	9									8	9	
5	12	0		0	39	12	5	0	3	9	10	0	40	10	1	0	16	10	7	0	50	10	10	9	9									9	9	
9	12	10		1	37	13	4	1	16	10	4	1	49	10	8	1	24	11	1	1	58	11	5	10	9									10	9	
3	13	9		2	28	14	2	2	18	11	0	2	46	11	3	2	31	11	9	3	1	12	0	11	9									11	9	
53	14	7		3	17	14	10	3	13	11	7	3	38	11	9	3	31	12	4	3	59	12	6	12	9									12	9	
40	15	1		4	3	15	3	4	3	11	11	4	28	12	1	4	26	12	8	4	51	12	9	0										13	9	
25	15	4		4	47	15	4	4	51	12	2	5	14	12	1	5	13	12	9	5	35	12	9	14	9									14	9	
10	15	3		5	33	15	0	5	37	12	0	6	0	11	11	5	58	12	8	6	20	12	7	15	9									15	9	
54	14	8		6	14	14	4	6	20	11	9	6	40	11	6	6	41	12	5	7	1	12	3	16	9									16	9	
35	13	11		6	57	13	6	7	0	11	2	7	21	10	11	7	21	12	1	7	41	11	10	17	9									17	9	
20	13	1		7	43	12	7	7	42	10	7	8	2	10	4	8	1	11	7	8	21	11	4	18	9									18	9	
6	12	1		8	30	11	7	8	21	10	0	8	42	9	9	8	39	11	0	8	57	10	9	19	9									19	9	
55	11	2		9	21	10	10	9	4	9	6	9	26	9	3	9	18	10	6	9	44	10	3	20	9									20	9	
50	10	7		10	24	10	6	9	51	9	1	10	23	9	0	10	13	10	9	10	45	9	10										21	9		
59	10	6		11	33	10	7	10	56	8	11	11	30	8	11	11	16	9	8	11	47	9	7	22	9									22	9	
—	—	—		0	6	10	9	—	—	—	—	0	4	9	0	—	—	—	—	0	17	9	9	23	9									23	9	
36	11	0		1	5	11	3	0	36	9	2	1	8	9	4	0	47	9	10	1	17	10	0	24	9									24	9	
30	11	7		1	52	11	11	1	39	9	6	2	6	9	9	1	47	10	3	2	16	10	6	25	9									25	9	
14	12	3		2	36	12	8	2	30	10	0	2	54	10	3	2	43	10	9	3	9	11	0	26	9									26	9	
57	12	11		3	16	13	3	3	15	10	6	3	36	10	9	3	33	11	3	3	56	11	6	27	9									27	9	
35	13	6		3	54	13	10	3	57	10	11	4	17	11	1	4	18	11	8	4	40	11	10	28	9									28	9	
14	14	1		4	31	14	3	4	37	11	3	4	57	11	5	5	11	11		5	19	12	1	●										29		
51	14	5		5	12	14	7	5	18	11	6	5	39	11	7	5	39	12	2	6	0	12	3	1	2									30		
an Spring } 7ft. 5in. ge.												5ft. 10in.												6ft. 2in.												

an Spring } 7 ft. 5 in.  
ge.

5 ft. 10 in.

6 ft. 2 in.

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
6 18	Add.	9	15 59	Add.	17	14 47	Add.	25	12 41	Add.
6 19		10	15 53		18	14 34		26	12 22	
6 18		11	15 46		19	14 20		27	12 2	
6 17		12	15 38		20	14 6		28	11 41	
6 15		13	15 30		21	13 50		29	11 20	
6 12		14	15 20		22	13 34		30	10 58	
6 9		15	15 10		23	13 17				
6 4		16	14 59		24	13 0				

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## DECEMBER, 1864.

WEEK DAY.		MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.								
				MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
				Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
Th.	1	1a 51		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.				
F.	2	2 47		4 41	18 9		5 11	18 9		6 36	15 6		6 55	15 0		0 20	12 5		0 40	12 1				
S.	3	3 41		5 22	18 7		5 43	18 5		7 14	15 5		7 35	14 10		1 0	12 5		1 22	12 1				
S.	4	4 34		6 5	18 2		6 29	17 9		7 56	15 3		8 17	14 5		1 43	12 4		2 6	12 1				
S.	5	5 26		6 54	17 4		7 20	16 10		8 40	14 10		9 4	13 11		2 31	12 1		2 55	12 1				
M.	6	6 17		7 47	16 4		8 15	15 11		9 28	14 3		9 56	13 4		3 20	11 9		3 45	11 1				
Tu.	7	7 8		8 46	15 6		9 17	15 4		10 24	13 9		10 55	13 0		4 12	11 4		4 41	11 1				
W.	8	8 0		9 52	15 3		10 28	15 3		11 28	13 4		—	—		5 11	10 11		5 45	10 1				
Th.	9	8 53		11 7	15 5		11 44	15 8		0 6	13 0		0 45	13 6		6 19	10 9		6 55	10 1				
F.	10	9 48		—	—		0 19	16 0		1 23	13 5		1 58	13 10		7 31	11 1		8 8	11 1				
S.	11	10 43		0 50	16 5		1 19	16 11		2 32	14 0		3 2	14 3		8 41	11 7		9 11	11 1				
S.	12	11 39		1 46	17 5		2 12	17 11		3 32	14 6		4 1	14 9		9 40	12 0		10 7	12 1				
M.	13	morn.		2 37	18 4		3 0	18 7		4 27	15 0		4 53	15 10		10 33	12 4		10 56	12 1				
Tu.	14	0 33		3 23	18 9		3 45	18 10		5 16	15 5		5 39	15 21		11 19	12 6		11 41	12 1				
W.	15	1 26		4 8	18 9		4 29	18 8		6 2	15 7		6 22	15 2		—	—		0 4	15 1				
Th.	16	2 16		4 48	18 7		5 7	18 4		6 42	15 7		6 59	14 11		0 26	12 5		0 46	12 1				
F.	17	3 3		5 25	18 0		5 43	17 9		7 17	15 3		7 34	14 5		1 7	12 3		1 26	12 1				
S.	18	3 48		6 3	17 5		6 21	17 0		7 52	14 9		8 10	13 10		1 44	12 0		2 3	12 1				
S.	19	4 31		6 41	16 6		7 0	16 1		8 26	14 2		8 41	13 2		2 22	11 8		2 42	11 1				
M.	20	5 13		7 20	15 7		7 42	15 1		8 58	13 5		9 17	12 7		3 1	11 3		3 20	11 1				
Tu.	21	5 55		8 2	14 7		8 23	14 2		9 37	12 9		9 56	12 0		3 40	10 11		4 0	10 1				
W.	22	6 37		8 47	13 10		9 15	13 7		10 20	12 3		10 45	11 9		4 20	10 5		4 43	10 1				
Th.	23	7 21		9 48	13 6		10 22	13 6		11 13	11 11		11 47	11 9		5 10	10 0		5 41	10 1				
F.	24	8 7		10 57	13 6		11 33	13 8		—	—		0 22	11 11		6 13	9 10		6 46	9 1				
S.	25	8 56		—	—		0 8	14 0		0 58	12 1		1 34	12 4		7 21	10 0		7 55	9 1				
S.	26	9 48		0 38	14 5		1 6	14 11		2 8	12 7		2 39	12 10		8 28	10 6		8 57	10 1				
M.	27	10 43		1 33	15 6		1 57	16 2		3 10	13 3		3 38	13 7		9 24	11 1		9 50	11 1				
Tu.	28	11 39		2 20	16 9		2 41	17 5		4 4	14 2		4 29	14 41		10 15	11 8		10 37	11 1				
W.	29	0a 36		3 3	18 0		3 25	18 6		4 53	14 11		5 17	14 9		10 59	12 2		11 21	12 1				
Th.	30	1 33		3 46	18 11		4 8	19 2		5 40	15 6		6 3	15 11		11 42	12 6		—	—				
F.	31	2 28		4 30	19 5		4 52	19 7		6 25	15 10		6 47	15 5		0 4	12 8		0 27	12 1				
S.	31	2 28		5 14	19 7		5 35	19 6		7 8	16 1		7 29	15 5		0 50	12 10		1 13	12 1				
Half Mean Spring } Range.				9ft. 6in.						7ft. 9in.						6ft. 4in.								
Phases of the Moon.				Moon's Declination at Noon.																				
				D.	H.	M.	M.D.				°	'	M.D.				°	'	M.D.				°	'
First Quarter				6	7	34	1				18	S. 52	9	12	N. 4	17	11	N. 23	25	1	1	1		
Full				13	7	12	2				16	58	10	15	28	18	7	49	26	1	1	1		
Last Quarter				21	5	3	3				14	3	11	17	57	19	3	59	27	1	1	1		
New				28	9	21	4				10	19	12	19	22	20	0	2	28	1	1	1		
In Perigee				6	10	0	5				5	59	13	19	39	21	3	S. 55	29	1	1	1		
In Apogee				20	9	0	6				1	20	14	18	51	22	7	45	30	1	1	1		
							7				3	N. 25	15	17	5	23	11	20	31	1	1	1		
							8				7	58	16	14	32	24	14	30						

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m.      DEVONPORT add 17 m.      PORTSMOUTH add 4 m.

## DECEMBER, 1864.

MONTH DAY.	DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.		
	MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.				
	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.			
1	—	—	0 14 18	5	1 33 15	11	1 53 15	11	3 4 18	11	3 23 19	0	2'2		
2	0 36	18	5	1 0 18	5	2 12 15	11	2 31 15	10	3 43 19	0	4 3 19	0	3'2	
3	1 23	18	4	1 46 18	2	2 52 15	9	3 12 15	8	4 24 18	11	4 44 18	10	4'2	
4	2 11	17	11	2 36 17	7	3 35 15	6	4 0 15	3	5 7 18	8	5 30 18	5	5'2	
5	3 1	17	3	3 26 16	11	4 25 15	0	4 50 14	9	5 56 18	3	6 21 17	11	6'2	
6	3 53	16	6	4 21 16	2	5 19 14	6	5 49 14	3	6 49 17	7	7 17 17	4	7'2	
7	4 49	15	10	5 18 15	8	6 22 14	0	6 56 13	11	7 48 17	2	8 24 17	0	8'2	
8	5 48	15	7	6 21 15	9	7 34 13	11	8 10 14	0	9 1 16	11	9 36 16	9	9'2	
9	6 57	16	1	7 34 16	5	8 46 14	2	9 21 14	5	10 14 16	11	10 48 17	0	10'2	
10	8 6	16	9	8 35 17	2	9 55 14	8	10 25 14	11	11 24 17	2	11 53 17	5	11'2	
11	9 3	17	6	9 31 17	9	10 53 15	2	11 19 15	5	—	—	0 23 17	9	12'2	
12	9 59	18	0	10 24 18	3	11 44 15	7	—	—	0 48 18	0	1 16 18	3	13'2	
1	10 48	18	4	11 13 18	5	0 9 15	9	0 33 15	11	1 40 18	6	2 4 18	8	14'2	
2	11 37	18	5	12 0 18	4	0 56 16	0	1 18 16	0	2 26 18	10	2 47 18	11	15'2	
3	—	—	—	0 21 18	3	1 40 16	0	2 0 15	11	3 9 19	0	3 29 19	0	16'2	
4	0 42	18	2	1 3 17	11	2 19 15	9	2 38 15	8	3 48 18	11	4 9 18	9	17'2	
5	1 23	17	9	1 44 17	6	2 55 15	6	3 13 15	3	4 26 18	7	4 44 18	5	18'2	
6	2 3	17	3	2 23 16	11	3 33 15	1	3 52 14	10	5 3 18	2	5 22 17	11	19'2	
7	2 43	16	7	3 2 16	3	4 11 14	6	4 31 14	3	5 43 17	8	6 2 17	5	20'2	
8	3 22	15	11	3 41 15	6	4 51 13	11	5 13 13	9	6 22 17	2	6 42 16	10	21'2	
9	4 1	15	2	4 21 14	9	5 35 13	6	5 58 13	4	7 4 16	7	7 25 16	4	22'2	
10	4 46	14	5	5 15 14	3	6 24 13	1	6 55 12	11	7 53 16	1	8 23 15	11	23'2	
11	5 44	14	2	6 13 14	2	7 29 12	11	8 4 12	11	8 58 15	10	9 31 15	9	24'2	
12	6 47	14	4	7 21 14	9	8 38 13	0	9 12 13	3	10 4 15	8	10 36 15	10	25'2	
1	7 53	15	1	8 22 15	6	9 45 13	6	10 15 13	9	11 10 16	0	11 41 16	2	26'2	
2	8 48	16	0	9 13 16	6	10 42 14	1	11 7 14	5	—	—	0 12 16	6	27'2	
3	9 38	16	11	10 2 17	4	11 30 14	8	11 53 15	0	0 36 16	10	0 58 17	3	28'2	
4	10 26	17	9	10 49 18	2	—	—	0 14 15	4	1 21 17	7	1 44 17	11	29'2	
5	11 13	18	6	11 37 18	9	0 36 15	7	0 58 15	10	2 6 18	4	2 28 18	8	30'6	
6	—	—	—	0 1 18	11	1 19 16	1	1 40 16	2	2 49 18	11	3 10 19	2	31'6	
7	0 25	19	1	0 49 19	2	2 1 16	3	2 22 16	4	3 32 19	5	3 52 19	6	32'6	
If Mean Spring } Range.				9ft. 4in.				8ft. 0in.				9ft. 7in.			

if Mean Spring }  
Range.

9ft. 4in.

8ft. 0in.

9ft. 7in.

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
10 35		9	7 13		17	3 25		25	0 35	
10 11		10	6 45		18	2 55		26	1 4	
9 47		11	6 18		19	2 25		27	1 34	
9 23		12	5 50		20	1 55		28	2 4	
8 58		13	5 21		21	1 26		29	2 33	
8 32		14	4 52		22	0 55		30	3 2	
8 6		15	4 23		23	0 25		31	3 31	
7 40		16	3 54		24	0 5	Sub.			

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
DOVER subtract 5 m.      SHEERNESS subtract 3 m.      LONDON 0 m.





## DECEMBER, 1864.

NORTH SHIELDS.					LEITH.					THURSO.					C's Age AT NOON.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	D.	
4 17 13 0		4 37 12 11			3 13 16 0		3 32 15 11			9 22 12 11		9 42 12 10		2.2	
4 58 12 10		5 20 12 8			3 52 15 10		4 15 15 9			10 5 12 9		10 28 12 6		3.2	
5 43 12 7		6 6 12 5			4 36 15 7		5 0 15 5			10 51 12 3		11 18 12 0		4.2	
6 31 12 3		6 57 12 0			5 26 15 2		5 53 14 11			11 45 11 9		—		5.2	
7 24 11 9		7 55 11 5			6 21 14 7		6 50 14 3			0 12 11 5		0 42 11 2		6.2	
8 27 11 1		9 3 10 11			7 22 14 0		7 57 13 9			1 13 10 11		1 48 10 8		7.2	
9 39 10 10		10 15 10 10			8 32 13 8		9 10 13 7			2 23 10 7		3 3 10 6		8.2	
10 49 10 11		11 23 11 1			9 44 13 8		10 17 13 9			3 41 10 5		4 17 10 6		9.2	
11 57 11 4		—			10 50 14 0		11 21 14 3			4 51 10 8		5 23 10 11		10.2	
0 28 11 6		0 56 11 9			11 50 14 6		—			5 52 11 2		6 17 11 7		11.2	
1 22 12 0		1 47 12 3			0 16 14 10		0 41 15 2			6 40 12 0		7 3 12 4		12.2	
2 12 12 6		2 36 12 8			1 7 15 6		1 33 15 9			7 25 12 8		7 45 12 11		13.2	
2 57 12 10		3 19 13 0			1 56 15 11		2 18 16 1			8 6 13 1		8 27 13 2		14.2	
3 41 13 1		4 3 13 1			2 39 16 2		3 0 16 1			8 48 13 1		9 8 13 0		15.2	
4 24 13 0		4 44 12 10			3 20 16 0		3 39 15 10			9 28 12 10		9 48 12 7		16.2	
5 4 12 7		5 23 12 4			3 59 15 7		4 18 15 4			10 8 12 4		10 28 12 1		17.2	
5 43 12 2		6 4 12 0			4 37 15 2		4 57 14 11			10 49 11 9		11 9 11 5		18.2	
6 23 11 9		6 43 11 6			5 17 14 8		5 38 14 4			11 30 11 2		11 52 10 11		19.2	
7 3 11 3		7 24 11 0			6 0 14 1		6 22 13 9			—		0 13 10 7		20.2	
7 48 10 8		8 13 10 4			6 44 13 5		7 7 13 1			0 36 10 3		0 59 10 0		21.2	
8 38 10 1		9 6 9 10			7 32 12 10		7 59 12 7			1 22 9 9		1 50 9 7		22.2	
9 38 9 9		10 12 9 9			8 30 12 5		9 5 12 4			2 22 9 5		2 58 9 3		23.2	
10 44 9 9		11 16 9 11			9 39 12 5		10 11 12 6			3 35 9 3		4 9 9 3		24.2	
11 48 10 1		—			10 42 12 7		11 13 12 10			4 43 9 4		5 15 9 6		25.2	
0 20 10 3		0 48 10 6			11 41 13 1		—			5 43 9 9		6 9 10 1		26.2	
1 13 10 9		1 36 11 1			0 7 13 5		0 30 13 10			6 31 10 7		6 51 11 1		27.2	
1 58 11 5		2 20 11 9			0 52 14 3		1 15 14 9			7 11 11 7		7 29 12 1		28.2	
2 41 12 2		3 1 12 6			1 37 15 2		1 58 15 7			7 48 12 7		8 8 12 11		29.2	
3 21 12 10		3 42 13 1			2 20 15 11		2 41 16 3			8 29 13 2		8 49 13 4		30.2	
4 3 13 3		4 25 13 5			3 1 16 5		3 21 16 6			9 10 13 6		9 32 13 6		31.2	
4 47 13 5		5 10 13 4			3 43 16 6		4 5 16 6			9 55 13 6		10 18 13 4		32.2	
Mean Spring } 6ft. 8in. Range.					8ft. 2in.					6ft. 7in.					

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
10 35		9	7 13		17	3 25		25	0 35	
10 11		10	6 45		18	2 55		26	1 4	
9 47		11	6 18		19	2 25		27	1 34	
9 23		12	5 50		20	1 55		28	2 4	
8 58		13	5 21		21	1 26		29	2 33	
8 32		14	4 52		22	0 55		30	3 2	
8 6		15	4 23		23	0 25		31	3 31	
7 40		16	3 54		24	0 5	Sub.			

s of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for NORTH SHIELDS add 6 m. LEITH add 13 m. THURSO add 14 m.



## DECEMBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
Th.	1	H. M.	H. M.	F. I.	F. I.	H. M.	F. I.	F. I.	H. M.	F. I.	F. I.	H. M.	F. I.	F. I.	H. M.	F. I.	F. I.	H. M.	F. I.	F. I.																					
F.	2	1 51	0 46	9 7	1 7	9 8	—	—	0 17	25 8	7 8	20 8	7 27	20 7																											
S.	3	2 47	1 27	9 8	1 48	9 8	0 37	25 7	0 58	25 6	7 48	20 6	8 10	20 4																											
S.	4	3 41	2 9	9 8	2 31	9 7	1 19	25 2	1 41	24 10	8 33	20 1	8 57	19 9																											
S.	5	4 34	2 54	9 6	3 18	9 5	2 5	24 5	2 29	24 0	9 20	19 4	9 43	18 11																											
M.	6	5 26	3 43	9 3	4 9	9 2	2 54	23 6	3 20	23 0	10 7	18 6	10 32	18 1																											
Tu.	7	6 17	4 37	9 1	5 7	8 11	3 49	22 6	4 22	22 1	10 58	17 7	11 24	17 2																											
W.	8	7 8	5 37	8 10	6 10	8 9	4 55	21 9	5 34	21 9	11 54	17 0	—	—																											
Th.	9	8 0	6 44	8 8	7 20	8 8	6 12	21 10	6 50	22 1	0 26	17 0	1 5	17 1																											
F.	10	8 53	7 56	8 9	8 31	8 11	7 25	22 6	7 59	22 11	1 45	17 5	2 23	17 18																											
S.	11	9 48	9 3	9 1	9 32	9 2	8 28	23 5	8 55	24 0	2 57	18 3	3 29	18 10																											
S.	12	10 43	10 0	9 3	10 28	9 4	9 21	24 5	9 46	24 10	4 0	19 3	4 30	19 9																											
M.	13	11 39	10 56	9 5	11 21	9 6	10 11	25 1	10 35	25 4	4 59	20 1	5 25	20 4																											
Tu.	14	morn.	11 45	9 6	—	—	10 58	25 6	11 21	25 8	5 49	20 6	6 12	20 8																											
W.	15	0 33	0 9	9 7	0 31	9 7	11 43	25 8	—	—	6 34	20 8	6 55	20 8																											
Th.	16	1 26	0 53	9 7	1 13	9 7	0 42	25 7	0 24	25 5	7 15	20 6	7 34	20 8																											
F.	17	2 16	1 33	9 6	1 51	9 6	0 44	25 2	1 24	24 10	7 52	20 0	8 10	19 8																											
S.	18	3 3	2 9	9 5	2 29	9 4	1 20	24 6	1 39	24 0	8 30	19 4	8 49	18 11																											
S.	19	3 48	2 47	9 3	3 6	9 1	1 58	23 6	2 17	23 0	9 8	18 6	9 26	18 1																											
M.	20	4 31	3 24	9 0	3 43	8 11	2 35	22 7	2 54	22 1	9 44	17 8	10 3	17 3																											
Tu.	21	5 13	4 4	8 9	4 24	8 8	3 15	21 7	3 35	21 1	10 21	16 10	10 39	16 4																											
W.	22	5 55	4 44	8 7	5 8	8 5	3 58	20 8	4 23	20 2	10 58	15 10	11 22	15 6																											
Th.	23	6 37	5 35	8 3	6 7	8 2	4 54	19 10	5 29	19 9	11 51	15 3	—	—																											
F.	24	7 21	6 39	8 1	7 12	8 1	6 5	19 9	6 41	19 11	0 21	15 3	0 54	15 3																											
S.	25	8 7	7 46	8 2	8 20	8 3	7 16	20 3	7 48	20 8	1 32	15 5	2 9	15 5																											
S.	26	8 56	8 50	8 5	9 19	8 7	8 19	21 1	8 45	21 8	2 43	16 2	3 14	16 5																											
M.	27	9 48	9 46	8 9	10 11	8 11	9 9	22 4	9 32	23 0	3 42	17 5	4 10	18 1																											
Tu.	28	10 43	10 35	9 0	10 59	9 2	9 55	23 7	10 16	24 2	4 37	18 7	5 2	19 2																											
W.	29	11 39	11 23	9 4	11 46	9 5	10 37	24 9	10 59	25 2	5 27	19 9	5 51	20 2																											
Th.	30	0 36	—	—	0 10	9 7	11 21	25 8	11 43	26 1	6 14	20 8	6 35	21 1																											
F.	31	1 33	0 32	9 9	0 54	9 10	—	—	0 6	26 4	6 57	21 4	7 18	21 6																											
S.	31	2 28	1 17	9 11	1 40	9 11	0 28	26 7	0 50	26 7	7 40	21 6	8 2	21 6																											
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
D. H. M.																					M.D. ° ' "																				
First Quarter- 6 7 34 Morning.																					1 18 S. 52 9 12 N. 4 17 11 N. 23 25 17 S. 4																				
Full - - - - 13 7 12 Morning.																					2 16 58 10 15 28 18 7 49 26 18 51																				
Last Quarter - 21 5 3 Morning.																					3 14 3 11 17 57 19 3 59 27 19 39																				
New - - - - 28 9 21 Afternoon.																					4 10 19 12 19 22 20 0 2 28 19 19																				
																					5 5 59 13 19 39 21 3 S. 55 29 17 48																				
In Perigee - - 6 10 0 Afternoon.																					6 1 20 14 18 51 22 7 45 30 15 10																				
In Apogee - - 20 9 0 Morning.																					7 3 N. 25 15 17 5 23 11 20 31 11 33																				
																					8 7 58 16 14 32 24 14 30																				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

## DECEMBER, 1864.

WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age at Noon.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	
7 51 36	9	8 10 36	9	11 3 15	9	11 23 15	8	—	—	0 6 10	9	2.2
8 30 36	9	8 50 36	6	11 46 15	7	—	—	0 27 10	9	0 49 10	8	3.2
9 11 36	2	9 33 35	7	0 9 15	6	0 34 15	3	1 12 10	6	1 35 10	5	4.2
9 54 34	11	10 14 34	3	1 0 15	0	1 27 14	9	2 0 10	3	2 26 10	1	5.2
10 35 33	5	11 0 32	9	1 54 14	6	2 23 14	3	2 53 9	11	3 22 9	10	6.2
11 27 32	0	11 57 31	5	2 54 14	0	3 29 13	9	3 52 9	8	4 27 9	6	7.2
—	—	0 30 31	1	4 4 13	7	4 42 13	7	5 1 9	5	5 34 9	4	8.2
1 43 31	1	1 41 31	3	5 17 13	8	5 51 13	10	6 6 9	5	6 38 9	7	9.2
2 18 31	8	2 56 32	3	6 24 14	1	6 55 14	3	7 11 9	9	7 44 9	11	10.2
3 32 32	10	4 7 33	8	7 24 14	6	7 51 14	10	8 15 10	0	8 45 10	2	11.2
4 40 34	5	5 11 35	2	8 17 15	1	8 42 15	4	9 14 10	4	9 41 10	6	12.2
5 40 35	9	6 6 36	1	9 6 15	6	9 29 15	8	10 6 10	7	10 26 10	9	13.2
6 31 36	4	6 55 36	7	9 51 15	9	10 12 15	10	10 47 10	10	11 9 10	11	14.2
7 18 36	9	7 39 36	8	10 32 15	10	10 51 15	9	11 31 10	10	11 52 10	9	15.2
7 58 36	6	8 17 36	2	11 9 15	7	11 29 15	5	—	—	0 12 10	8	16.2
8 34 35	10	8 51 35	5	11 49 15	3	—	—	0 33 10	7	0 52 10	5	17.2
9 9 34	11	9 26 34	3	0 9 15	0	0 30 14	9	1 11 10	3	1 32 10	1	18.2
9 43 33	7	9 59 32	11	0 51 14	5	1 12 14	2	1 51 9	11	2 12 9	9	19.2
10 15 32	2	10 31 31	5	1 33 13	11	1 54 13	8	2 33 9	8	2 53 9	6	20.2
10 48 30	8	11 6 29	11	2 17 13	4	2 40 13	1	3 15 9	4	3 38 9	2	21.2
11 28 29	3	11 55 28	8	3 3 12	10	3 31 12	7	4 2 9	0	4 29 8	11	22.2
—	—	0 26 28	3	4 3 12	6	4 38 12	5	4 59 8	9	5 31 8	8	23.2
0 58 28	2	1 32 28	3	5 12 12	5	5 44 12	6	6 2 8	9	6 32 8	10	24.2
2 7 28	6	2 42 28	11	6 16 12	9	6 47 12	11	7 3 9	0	7 34 9	1	25.2
3 16 29	7	3 49 30	4	7 15 13	2	7 41 13	5	8 3 9	3	8 31 9	5	26.2
4 20 31	4	4 49 32	4	8 5 13	10	8 28 14	3	8 58 9	8	9 24 9	11	27.2
5 18 33	4	5 43 34	4	8 50 14	7	9 10 14	11	9 49 10	1	10 10 10	3	28.2
6 8 35	3	6 33 36	0	9 31 15	3	9 53 15	7	10 29 10	6	10 49 10	9	29.2
6 56 36	7	7 18 37	3	10 14 15	10	10 34 16	1	11 11 10	11	11 31 10	0	30.2
7 40 37	9	8 1 38	1	10 53 16	2	11 13 16	3	11 53 11	1	—	—	31.2
8 23 38	3	8 44 38	3	11 36 16	4	11 59 16	3	0 16 11	1	0 39 11	1	32.2
Mean Spring Tide.		18 ft. 7 in.		8 ft. 0 in.				5 ft. 6 in.				

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
10 35		9	7 13		17	3 25		25	0 35	
10 11		10	6 45		18	2 55		26	1 4	
9 47		11	6 18		19	2 25		27	1 34	
9 23		12	5 50		20	1 55		28	2 4	
8 58		13	5 21		21	1 26		29	2 33	
8 32		14	4 52		22	0 55		30	3 2	
8 6		15	4 23		23	0 25		31	3 31	
7 40		16	3 54		24	0 5	Sub.			

es of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 ON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.

## DECEMBER, 1864.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
Th.	1	12 51	11 41	9 4	—	—	8 53	7 6	9 11	7 5	6 11	11 0	6 32	—	—	—	—	—	—	
F.	2	2 47	0 2	9 4	0 25	9 4	9 31	7 4	9 51	7 3	6 53	10 9	7 15	—	—	—	—	—	—	
S.	3	3 41	0 48	9 3	1 12	9 2	10 14	7 1	10 39	6 11	7 38	10 4	8 2	—	—	—	—	—	—	
Th.	4	4 34	1 39	9 1	2 7	9 0	11 6	6 9	11 39	6 6	8 28	9 10	8 55	—	—	—	—	—	—	
M.	5	5 26	2 36	8 11	3 5	8 9	—	—	0 15	6 4	9 28	9 5	10 1	—	—	—	—	—	—	
Tu.	6	6 17	3 36	8 8	4 9	8 7	0 53	6 2	1 34	6 1	10 38	9 2	11 14	—	—	—	—	—	—	
W.	7	7 8	4 42	8 6	5 16	8 5	2 16	6 1	2 53	6 3	11 49	9 1	—	—	—	—	—	—	—	
Th.	8	8 0	5 48	8 5	6 22	8 5	3 24	6 5	3 55	6 7	0 22	9 1	0 56	—	—	—	—	—	—	
F.	9	8 53	6 56	8 6	7 29	8 7	4 23	6 9	4 49	6 11	1 29	9 4	2 2	—	—	—	—	—	—	
S.	10	9 48	7 58	8 8	8 25	8 10	5 13	7 0	5 36	7 2	2 30	9 9	2 56	—	—	—	—	—	—	
Th.	11	10 43	8 51	9 1	9 17	9 2	6 1	7 3	6 27	7 4	3 20	10 3	3 44	—	—	—	—	—	—	
M.	12	11 39	9 42	9 3	10 5	9 4	6 53	7 5	7 18	7 6	4 8	10 9	4 31	—	—	—	—	—	—	
Tu.	13	morn.	10 26	9 5	10 48	9 5	7 41	7 7	8 2	7 8	4 54	11 0	5 18	—	—	—	—	—	—	
W.	14	0 33	10 10	9 5	11 29	9 4	8 23	7 8	8 41	7 7	5 40	11 1	5 59	—	—	—	—	—	—	
Th.	15	1 26	11 48	9 3	—	—	8 59	7 5	9 17	7 3	6 18	10 11	6 38	—	—	—	—	—	—	
F.	16	2 16	0 8	9 3	0 28	9 2	9 35	7 1	9 52	7 0	6 57	10 6	7 15	—	—	—	—	—	—	
S.	17	3 3	0 48	9 1	1 9	9 0	10 11	6 10	10 30	6 8	7 35	10 0	7 53	—	—	—	—	—	—	
Th.	18	3 48	1 30	8 11	1 52	8 10	10 50	6 6	11 14	6 3	8 13	9 5	8 34	—	—	—	—	—	—	
M.	19	4 31	2 14	8 8	2 37	8 7	11 39	6 1	—	—	8 56	9 0	9 21	—	—	—	—	—	—	
Tu.	20	5 13	3 0	8 5	3 22	8 4	0 8	5 10	0 37	5 8	9 46	8 7	10 12	—	—	—	—	—	—	
W.	21	5 55	3 45	8 3	4 10	8 2	1 6	5 7	1 38	5 6	10 40	8 3	11 12	—	—	—	—	—	—	
Th.	22	6 37	4 40	8 1	5 12	8 0	2 15	5 6	2 49	5 6	11 44	8 2	—	—	—	—	—	—	—	
F.	23	7 21	5 43	8 0	6 15	7 11	3 21	5 8	3 50	5 10	0 16	8 3	0 48	—	—	—	—	—	—	
S.	24	8 7	6 48	8 0	7 20	8 0	4 19	6 0	4 44	6 2	1 21	8 4	1 53	—	—	—	—	—	—	
Th.	25	8 56	7 49	8 2	8 15	8 4	5 7	6 3	5 29	6 5	2 22	8 9	2 47	—	—	—	—	—	—	
M.	26	9 48	8 39	8 6	9 2	8 9	5 50	6 7	6 11	6 9	3 10	9 4	3 31	—	—	—	—	—	—	
Tu.	27	10 43	9 25	8 11	9 46	9 1	6 34	6 11	6 57	7 2	3 52	10 0	4 12	—	—	—	—	—	—	
W.	28	11 39	10 7	9 3	10 28	9 4	7 20	7 4	7 43	7 6	4 33	10 7	4 56	—	—	—	—	—	—	
Th.	29	0 36	10 49	9 5	11 10	9 6	8 4	7 8	8 24	7 9	5 18	11 1	5 40	—	—	—	—	—	—	
F.	30	1 33	11 31	9 6	11 51	9 6	8 43	7 10	9 3	7 10	6 11	11 5	6 22	—	—	—	—	—	—	
S.	31	2 28	—	—	0 14	9 7	9 24	7 9	9 45	7 8	6 45	11 4	7 7	—	—	—	—	—	—	
Half Mean Spring } Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.					
Phases of the Moon.							Moon's Declination at Noon.													
							M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'		
First Quarter -							6	7	34	Morning.	1	18	S. 52	9	12	N. 4	17	11	N. 23	
Full - - -							13	7	12	Morning.	2	16	58	10	15	28	18	7	49	
Last Quarter -							21	5	3	Morning.	3	14	3	11	17	57	19	3	59	
New - - - -							28	9	21	Afternoon.	4	10	19	12	19	22	20	0	2	
											5	5	59	13	19	39	21	3	S. 55	
In Perigee - -							6	10	0	Afternoon.	6	1	20	14	18	51	22	7	45	
In Apogee - -							20	9	0	Morning.	7	3	N. 25	15	17	5	23	11	20	
											8	7	58	16	14	32	24	14	30	

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required BELFAST subtract 2 m. LONDONDERRY add 4 m. SLIGO BAY add 9 m.

## DECEMBER, 1864.

GALWAY.								QUEENSTOWN.								WATERFORD.								C's Age at Noon.
MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
Time. L. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	D.						
5 32	14 7	5 53	14 6	5 59	11 7	6 19	11 7	6 20	12 3	6 40	12 4	2.2												
6 15	14 5	6 37	14 3	6 41	11 6	7 2	11 5	7 1	12 3	7 22	12 3	3.2												
7 0	14 0	7 25	13 9	7 24	11 3	7 48	11 1	7 44	12 2	8 7	12 1	4.2												
7 52	13 6	8 19	13 1	8 11	10 11	8 34	10 8	8 29	11 11	8 51	11 8	5.2												
8 47	12 8	9 16	12 4	8 59	10 5	9 25	10 3	9 13	11 6	9 39	11 3	6.2												
9 48	12 1	10 21	11 11	9 52	10 1	10 21	9 11	10 11	11 0	10 43	10 10	7												
0 58	11 11	11 33	12 0	10 56	9 10	11 31	9 10	11 15	10 8	11 46	10 7	8.2												
—	—	0 8	12 2	—	—	0 6	9 11	—	—	0 18	10 8	9.2												
0 41	12 5	1 13	12 8	0 42	10 1	1 20	10 3	0 52	10 10	1 28	11 0	10.2												
1 41	12 11	2 8	13 3	1 53	10 5	2 24	10 8	2 3	11 2	2 37	11 5	11.2												
2 36	13 6	3 3	13 10	2 54	10 10	3 22	11 1	3 9	11 8	3 40	11 10	12.2												
3 28	14 1	3 51	14 3	3 50	11 3	4 14	11 5	4 9	12 0	4 36	12 1	13.2												
4 13	14 5	4 35	14 7	4 37	11 6	5 1	11 7	5 0	12 2	5 23	12 2	14.2												
4 57	14 7	5 19	14 6	5 24	11 7	5 46	11 7	5 45	12 3	6 6	12 3	15.2												
5 39	14 5	5 59	14 3	6 5	11 6	6 25	11 5	6 26	12 2	6 46	12 1	16.2												
6 18	14 0	6 37	13 9	6 44	11 3	7 2	11 1	7 5	12 0	7 24	11 11	17.2												
6 58	13 6	7 17	13 2	7 21	10 11	7 40	10 8	7 43	11 9	8 0	11 7	18.2												
7 37	12 10	7 58	12 7	7 59	10 6	8 16	10 3	8 17	11 5	8 35	11 3	19.2												
8 18	12 2	8 40	11 9	8 33	10 1	8 53	9 10	8 51	11 1	9 9	10 10	20.2												
9 2	11 5	9 24	11 1	9 13	9 7	9 31	9 5	9 27	10 8	9 47	10 5	21.2												
9 49	10 10	10 20	10 8	9 52	9 3	10 19	9 11	10 12	10 2	10 42	9 11	22.2												
0 53	10 7	11 27	10 8	10 52	9 0	11 25	8 11	11 13	9 10	11 43	9 9	23.2												
2 0	10 9	—	—	11 58	9 0	—	—	—	—	0 13	9 8	24.2												
0 33	10 11	1 5	11 2	0 32	9 1	1 6	9 3	0 44	9 10	1 16	9 11	25.2												
1 33	11 5	1 58	11 9	1 40	9 5	2 10	9 8	1 48	10 2	2 20	10 5	26.2												
2 22	12 3	2 46	12 8	2 38	9 11	3 4	10 3	2 50	10 9	3 19	11 0	27.2												
3 10	13 0	3 32	13 5	3 29	10 6	3 53	10 10	3 47	11 3	4 12	11 7	28.2												
3 53	13 10	4 15	14 2	4 16	11 2	4 39	11 5	4 38	11 10	5 2	12 1	29.2												
4 37	14 7	4 58	14 10	5 2	11 7	5 24	11 9	5 25	12 3	5 45	12 5	30.6												
5 20	15 1	5 42	15 2	5 47	11 11	6 9	12 0	6 7	12 7	6 29	12 8	31.6												
6 5	15 2	6 28	15 1	6 32	12 0	6 54	12 0	6 52	12 9	7 15	12 9	32.6												
mean Spring tides. } 7ft. 5in.				5ft. 10in.				6ft. 2in.																

## Equation of Time at Noon.

M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
10 35	Add.	9	7 13	Add.	17	3 25	Add.	25	0 35	Sub.
10 11		10	6 45		18	2 55		26	1 4	
9 47		11	6 18		19	2 25		27	1 34	
9 23		12	5 50		20	1 55		28	2 4	
8 58		13	5 21		21	1 26		29	2 33	
8 32		14	4 52		22	0 55		30	3 2	
8 6		15	4 23		23	0 25		31	3 31	
7 40		16	3 54		24	0 5	Sub.			

s of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
ALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 8 m.

TIDE TABLES FOR THE

TABLE (B.)—For finding the Height of the Tide at any intermediate Hour between High and Low Water.

Height above Half-tide or Mean Level of the Sea.	Time from High Water.																								
	H. M.		H. M.		H. M.		H. M.		H. M.		H. M.		H. M.		H. M.		H. M.		H. M.		H. M.		H. M.		
	0 00		0 30		1 00		1 30		2 00		2 30		3 00		3 30		4 00		4 30		5 00		5 30		
	Add												Subtract												
Feet.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	
3	3	0	2	11	2	7	2	1	1	6	0	9	0	0	0	9	1	6	2	1	2	7	2	11	3
4	4	0	3	10	3	6	2	10	2	0	1	0	0	0	1	0	2	0	2	10	3	6	3	10	4
5	5	0	4	10	4	4	3	6	2	6	1	3	0	0	1	3	2	6	3	6	4	4	4	10	5
6	6	0	5	10	5	2	4	3	3	0	1	7	0	0	1	7	3	0	4	3	5	2	5	10	6
7	7	0	6	9	6	1	4	11	3	6	1	10	0	0	1	10	3	6	4	11	6	1	6	9	7
8	8	0	7	9	6	11	5	8	4	0	2	1	0	0	2	1	4	0	5	8	6	11	7	9	8
9	9	0	8	8	7	9	6	4	4	6	2	4	0	0	2	4	4	6	6	4	7	9	8	8	9
10	10	0	9	8	8	8	7	1	5	0	2	7	0	0	2	7	5	0	7	1	8	8	9	8	10
11	11	0	10	8	9	6	7	9	5	6	2	10	0	0	2	10	5	6	7	9	9	6	10	8	11
12	12	0	11	7	10	5	8	6	6	0	3	1	0	0	3	1	6	0	8	6	10	5	11	7	12
13	13	0	12	7	11	3	9	2	6	6	3	4	0	0	3	4	6	6	9	2	11	3	12	7	13
14	14	0	13	6	12	1	9	11	7	0	3	7	0	0	3	7	7	0	9	11	12	1	13	6	14
15	15	0	14	6	13	0	10	7	7	6	3	11	0	0	3	11	7	6	10	7	13	0	14	6	15
16	16	0	15	5	13	10	11	4	8	0	4	2	0	0	4	2	8	0	11	4	13	10	15	5	16
17	17	0	16	5	14	9	12	0	8	6	4	5	0	0	4	5	8	6	12	0	14	9	16	5	17
18	18	0	17	5	15	7	12	9	9	0	4	8	0	0	4	8	9	0	12	9	15	7	17	5	18
19	19	0	18	4	16	5	13	5	9	6	4	11	0	0	4	11	9	6	13	5	16	5	18	4	19
20	20	0	19	4	17	4	14	2	10	0	5	2	0	0	5	2	10	0	14	2	17	4	19	4	20
21	21	0	20	3	18	2	14	10	10	6	5	5	0	0	5	5	10	6	14	10	18	2	20	3	21
22	22	0	21	3	19	1	15	7	11	0	5	8	0	0	5	8	11	0	15	7	19	1	21	3	22
23	23	0	22	3	19	11	16	3	11	6	5	11	0	0	5	11	11	6	16	3	19	11	22	3	23
24	24	0	23	2	20	9	17	0	12	0	6	2	0	0	6	2	12	0	17	0	20	9	23	2	24

RULE.—To find the Height of the Tide above the zero of the tables at any intermediate Hour between *High and Low Water*.\*

The zero of the tables is the mean height of the low water of ordinary spring tides.

From the height in the tables, subtract the half mean spring range, the remainder will be the height above the half-tide or mean level of the sea, with which enter Table (B.), and, under the time from high water, take out the corresponding correction, and, as directed, add it to,

\* The mean interval of time between two consecutive high waters is about 12h. 25m., but for the mariner's purpose the duration of flood or ebb may be considered as 6 hours. There are occasional exceptions; at Portsmouth, for example, the flood runs 7 hours and the ebb 5 hours.

or subtract it from, the half mean spring range; the result will be the height of the tide at that time above zero or the low-water standard of the tables.

## EXAMPLE I.

Required the height of the tide above zero at Liverpool on March 2nd, P.M., at 2 h. after high water.

Height of high water (by the tables)	-	-	-	-	Ft. in.
Half mean spring range	-	-	-	-	20 0
					13 0
Height above the half-tide or mean level of the sea -					7 0
Half mean spring range	-	-	-	-	13 0
By table (B) 7 ft. 0 in. gives	-	-	-	-	+ 3 6
Height of the tide above zero at 2 h. after high water =					16 6

## EXAMPLE II.

Required the height of the tide above zero, at Liverpool on March 9th, A.M., at 4 h. after high water.

Height of high water (by the tables)	-	-	-	-	Ft. in.
Half mean spring range	-	-	-	-	28 6
					13 0
Height above the half-tide or mean level of the sea -					15 6
Half mean spring range	-	-	-	-	13 0
By table (B) 15 ft. 6 in. gives	-	-	-	-	7 9
Height of the tide above zero at 4 h. after high water =					5 3

In some cases, however, between 5 and 6 h. from high water, the correction from table (B) will be greater than the half mean spring range; when such is the case, the tide at that time will have fallen *below* the zero of the tables by a quantity equal to the difference between the correction from table (B) and the half mean spring range.

## EXAMPLE III.

Required the level of the tide at Liverpool on March 9th, A.M. at  $5\frac{1}{2}$  h. after high water.

Height of high water (by the tables)	-	-	-	-	Ft. in.
Half mean spring range	-	-	-	-	28 0
					13 0
Height above the half tide or mean level of the sea -					15 6
Half mean spring range	-	-	-	-	13 0
By table (B) 15 ft. 6 in. at $5\frac{1}{2}$ h. from high water	-	-	-	-	15 0
Level of the tide <i>below</i> zero					2 0

As stated in the advertisement, the soundings in most charts are reduced to the same zero as these tables,—viz., the mean level of the low water of ordinary spring tides,—but should the soundings on any particular chart be reduced to a standard below that zero, there will, in that case, be a greater depth of water in the channel than is given in the tables, by a quantity equal to the difference between the half mean spring range and the half spring range of the chart, or in other words, the difference between the mean level of the low water of spring tides, and the low-water standard to which the soundings on the chart are reduced: for example—The soundings on the chart of Liverpool are reduced to

a zero 15 ft. below the mean level of the sea, whereas, the mean spring range for that place, as shown in the result of two years' observations (1854 and 1855) of the Self-registering Tide Gauge at St. Georges Pier, being 26 ft. gives 13 ft. below the mean level of the sea; consequently 2 ft. will have to be added to the results deduced from table (B.)

Thus, in Example I. On the chart of Liverpool 11 ft. being marked on the bar of the Victoria Channel, the actual depth over the bar at 2h. after high water would be 16 ft. 6 in. + 11 ft. 0 in. + 2ft. 0 in. = 29ft. 6 in.

#### CORRECTIONS FOR CERTAIN DOCKS, &c.\*

The depth at high water on the sills of the following Docks may be known, by applying to the standard high water heights given in the foregoing Tables the annexed correction according to the sign.

			Ft.	in
<i>Falmouth</i> —Over the Sill of Graving Dock No. 1.	-	-	2	0
		Graving Dock No. 2.	-	0
		(applied to the heights given for Holyhead.)		
<i>Devonport</i> —Over the Sill of Basin	-	-	+ 15	8
<i>H. M. Dockyard.</i> „ South Dock	-	-	+ 12	8
		New Long Dock	-	+ 16
		Old North Dock	-	+ 4
		New North Dock	-	+ 4
„ <i>Keyham</i> „ Entrance to Lock	-	-	+ 18	2
		Entrance to North Basin	-	+ 9
		No. 1 Dock	-	+ 8
		2 „	-	+ 5
		3 „	-	+ 9
<i>Plymouth</i> —Great Western Docks, Millbay.				
Over the Sill of Floating Dock	-	-	+ 10	3
		Graving Dock	-	+ 11
		(applied to the heights given for Devonport.)		
<i>Portsmouth</i> —Over the Sill of No. 1 or South Dock	-	-	+ 6	8
<i>H. M. Dockyard.</i> „ Entrance				
		No. 2	+ 13	4
		3	+ 10	4
		4	+ 12	5
		5	+ 13	0
			+ 6	10
<i>Portsmouth</i> —Over the Sill of No. 6 or North Dock	-	-	+ 6	4
<i>H. M. Dockyard.</i> „ Entrance				
		No. 7	+ 12	2
		8	+ 12	2
		9 at N. end of Slips	+ 9	1
		10 South „	+ 8	1
			+ 14	2
<i>Sheerness</i> —Over the Invert at the				
<i>H. M. Dockyard.</i> entrance	-			
		Sill of No. 1 Dock	+ 9	8
		2 „	+ 9	2
		3 „	+ 9	2
		No. 4 Dock	+ 9	2
		5 „	+ 3	10
			- 1	4

\* As it is desirable that the information here given should be accurate and complete, it is requested that corrections and additions be forwarded to the Secretary of the Admiralty.

ISLANDS OF GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Isle of Man . . . . .	- 2 10	..	Weston-super-mare.
Island . . . . .	- 1 41	..	"
Island . . . . .	- 1 39	..	"
Island . . . . .	- 1 24	..	"
Island . . . . .	- 1 12	..	"
Island . . . . .	- 0 4	..	"
Island . . . . .	+ 0 22	..	"
Island (King Road) . . . . .	+ 0 2	..	"
Island . . . . .	+ 0 5	..	"
Island (Mumbles Lighthouse) . . . . .	- 0 11	..	Pembroke.
Island . . . . .	+ 0 4	..	"
Island . . . . .	- 0 12	..	"
Island . . . . .	- 0 20	..	"
Island (entrance) . . . . .	- 3 15	- 4 5	Holyhead.
Island, Goodie Pier . . . . .	- 3 10	..	"
Island . . . . .	- 2 40	- 3 0	"
Island . . . . .	- 2 11	..	"
Island . . . . .	- 2 31	..	"
Island . . . . .	- 2 25	..	"
Island . . . . .	- 2 31	..	"
Island . . . . .	- 1 41	..	"
Island . . . . .	- 0 38	- 2 3	"
Island . . . . .	- 0 51	- 4 7	Liverpool.
Island (Wyre Lighthouse) . . . . .	- 0 12	..	"
Island . . . . .	+ 0 3	+ 1 3	"
Island . . . . .	- 0 9	- 2 9	"
Island Head and Port Har- } . . . . .	- 0 18	..	"
Island . . . . .	- 0 19	..	"
Island . . . . .	- 0 20	..	"
Island Head . . . . .	- 0 13	..	"
Island . . . . .	- 0 3	..	"
Island Foot . . . . .	+ 0 33	..	"
Island . . . . .	+ 0 47	..	"
Island . . . . .	+ 1 1	..	Holyhead.
Island . . . . .	+ 1 1	+ 3 3	"
Island . . . . .	+ 0 57	+ 0 3	"
Island Point, Solway Firth . . . . .	- 0 1	- 2 11	Liverpool.
Island Patrick . . . . .	- 0 58	..	Greenock.
Island Ryan . . . . .	- 0 56	..	"
Island . . . . .	- 0 19	..	"
Island . . . . .	- 0 23	..	"
Island . . . . .	- 0 18	- 1 0	"
Island . . . . .	- 0 23	..	"
Island . . . . .	- 0 18	..	"
Island . . . . .	- 0 2	..	"
Island Glasgow . . . . .	+ 0 10	..	"
Island . . . . .	+ 1 17	..	"
Island . . . . .	+ 4 41	..	"
Island . . . . .	- 2 52	..	Thurso.
Island, Isle of Mull . . . . .	- 1 56	..	"
Island, Isle of Skye . . . . .	- 1 47	..	"
Island . . . . .	- 2 12	..	"
Island . . . . .	- 1 51	..	"
Island, Summer Isles . . . . .	- 1 42	..	"
Island, Isle of Lewis . . . . .	- 0 58	..	"
Island Wrath . . . . .	- 0 58	..	"



Over the Sill of Canada Half-tide Dock, W. Entrance	-
" Northern West Lock Entrance	-
" Southern West Lock Entrance	-
" " North Passage	-
" " South Passage	-
" Canada Dock, South Passages, East	-
" " " West	-
" " Lock	-
" Huskisson Dock, East Lock	-
" " West	-
" Sandon Dock, West Entrance	-
" Wellington Half-tide Dock, East Entrance	-
" " West	-
" Wellington Dock, West Passage	-
" Bramley-Moore Dock, North Passage	-
" " South Passage	-
" Nelson Dock, South Passage	-
" Stanley Dock, West Passage	-
" Collingwood Dock, West Passage	-
" Salisbury Dock, West Entrances, North	-
" " South	-
" Clarence Graving Dock " Basin, N. Passage	-
" " " S. Passage	-
" Clarence Half-tide Dock, West Entrance	-
" " Dock, West Passage	-
" Trafalgar Lock, North and South Passages	-
" " Dock, South Passage	-
" Victoria Dock, South Passage	-
" Waterloo Dock and Lock, North Passage	-
" " South Entrance	-
" Princes Dock and Locks, North Entrance	-
" " South Entrance	-
" Georges Dock and Passage, North Entrance	-
" " South Passage	-
" Manchester Dock, West Entrance	-
" " Lock, West Entrance	-
" Canning Dock, West Passage	-
" " Half-tide Basin, two West En- } trances, each	-
" Albert Dock, North Passage	-
" " East Passage	-
" Salthouse Dock, North Passage	-
" Wapping Basin, West Passage	-
" " North and South Passages, } each	-
" " Dock, West Passage	-
" " South Passage	-
" Kings Dock, South Passage	-
" Queens Dock Basin, West Entrances, North	-
" " South	-
" " West Passage	-
" " South Passage	-
" Coburg Dock, West Entrance	-
" Brunswick Dock, North Passage	-
" " Half-tide Dock, East Passage	-
" " West Entrance	-
" Toxteth Dock, West Entrance	-
" Harrington Dock, West Entrance	-
" Garston Dock	-

*Liverpool*—continued :

	Ft.	in.
Over the Sill of River Craft Dock, Lock, and Eagle Basin, Outer Gates } — 8 6		
„ „ „ „ Inner „ — 9 6		
„ Duke of Bridgewater's Dock, Outer Gates — 3 9		
„ „ „ „ Middle „ — 8 9		
„ „ „ „ Inner „ — 2 3		
„ Canada Lock and Graving Dock - - - - - 0 6		
„ Huskisson Lock and Graving Dock - - - - - 1 9		
„ Sandon Graving Docks, Nos. 1 to 5, East - - - - - 4 9		
„ „ „ „ No. 6, West - - - - - 4 9		
„ Canning Graving Docks, No. 1 - - - - - 10 0		
„ „ „ „ No. 2 - - - - - 8 3		
„ Queens Graving Docks, No. 1 - - - - - 6 7		
„ „ „ „ No. 2 - - - - - 4 9		
„ Brunswick Graving Docks, No. 1 - - - - - 5 9		
„ „ „ „ No. 2 - - - - - 5 9		

*Birkenhead*—

Over the Sill of Morpeth Dock from Morpeth Basin - - - - -	3	3
„ Sills of Caisson between Egerton and Morpeth Docks - - - - -	0	9
„ Sill of Reverse Gate - - - - -	2	9
„ Sills of Caisson between Egerton Dock and Great Float - - - - -	0	9
„ „ „ „ East and West Floats - - - - -	0	9
„ Lock from Low-water Basin into Great Float* Outer Sill + 3 9		
„ „ „ „ Inner Sill + 0 9		
„ Graving Dock No. 1.* - - - - -	0	9
„ „ „ „ 2.* - - - - -	0	9
(applied to the heights given for Liverpool.)		

*Dublin*—

Over the Sill of North Wall Graving Dock - - - - -	+ 6	0
„ Old Custom House Dock - - - - -	+ 3	5
„ Georges Dock - - - - -	+ 5	5
„ Camden Lock of Grand Canal Dock - - - - -	+ 7	0
(applied to the heights given for Kingstown.)		

*Londonderry*—

Over the Sill of Graving Dock - - - - -	+ 6	9
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## TIDAL CONSTANTS

FOR

## VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

THE following table contains Tidal Constants for several places on the coasts of the United Kingdom and of Europe, which, being applied according to the sign + or — to the times or heights belonging to the standard port to which each of them is referred, will afford a ready means of determining approximately the height as well as the time of high water at each of those several places.

[NOTE.] In the tables from 1850–1858 the Constants for the height were given for such places only where the curves for the place and the standard port were similar, the Constant being the difference between the whole rise at the two places. But as that arrangement, which at times referred necessarily to a standard port on a distant part of the coast, appears to have confused the mariner, he is now referred to the standard port in the locality of the required place, which although the result deduced thereby may not be strictly accurate, yet it is sufficiently near for practical purposes.

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\* In course of construction, and nearly completed. .

COAST OF IRELAND.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Skull . . . . .	— 0 59	— 2 1	Queenstown.
Crookhaven . . . . .	— 0 52	..	"
Dunmanus Harbour . . . . .	— 1 4	— 2 4	"
Dunbeacon, Dunmanus Bay . . . . .	— 1 10	— 1 7	"
Black Ball Harbour . . . . .	— 1 21	— 2 3	"
Castletown, Bearhaven . . . . .	— 0 47	— 2 0	"
Bantry Harbour . . . . .	— 1 14	— 1 7	"
West Cove, Kenmare River . . . . .	— 1 9	— 1 9	"
Valentia Harbour . . . . .	— 1 19	— 0 8	"
Limerick, R. Shannon . . . . .	+ 1 45	+ 1 9	Galway.
Mellon . . . . .	+ 1 26	..	"
Foynes Island . . . . .	+ 1 0	+ 0 7	"
Tarbert . . . . .	+ 0 22	— 0 7	"
Kilrush . . . . .	+ 0 7	..	"
Carrigaholt . . . . .	+ 0 9	..	"
Kilbaha . . . . .	— 0 19	— 1 9	"
Roundstone . . . . .	— 0 50	+ 1 9	Sligo.
Inishbofin . . . . .	— 0 44	+ 0 4	"
Westport . . . . .	— 0 21	+ 1 1	"
Achillbeg . . . . .	— 0 4	— 0 6	"
Blacksod Bay (Quay) . . . . .	— 0 31	..	"
Broadhaven Harbour . . . . .	— 0 18	— 0 9	"
Donegal Harbour, (Salthill Quay) . . . . .	+ 0 5	..	"
Killybegs . . . . .	+ 0 13	..	"
Lough Rossmore . . . . .	+ 0 19	..	"
Gweedore Bay (Bunbeg) . . . . .	+ 0 14	— 0 6	"
Sheephaven . . . . .	+ 0 7	+ 0 7	"
Rathmullan, Lough Swilly . . . . .	+ 0 24	..	"
Coleraine . . . . .	— 1 37	— 1 6	Londonderry.
Port Rush . . . . .	— 1 53	— 2 6	"
Ballycastle Bay . . . . .	— 4 18	..	Belfast.
Lough Larne . . . . .	— 0 13	..	"
Donaghadee . . . . .	+ 0 3	+ 0 3	Kingstown.
Lough Strangford (Killard Point) . . . . .	— 0 17	..	"
" Strangford Quay . . . . .	+ 1 21	..	"
" Carlingford (Bar) or Cranfield Point . . . . .	— 0 10	..	"
Warrenpoint . . . . .	0 0	+ 3 1	"
Howth . . . . .	— 0 1	..	"
Dublin Bar . . . . .	+ 0 2	..	"
Wicklow . . . . .	— 0 41	..	"
Arklow . . . . .	— 2 25	..	"
Wexford . . . . .	+ 2 1	— 7 4	Waterford.
New Ross . . . . .	+ 0 44	+ 0 1	"
Waterford Bridge . . . . .	+ 0 46	+ 1 0	"
Dunmore . . . . .	+ 0 7	— 0 2	"
Ballinacourty, Dungarvan . . . . .	— 0 8	0 0	"
Youghal . . . . .	— 0 6	+ 0 3	"
Ballycotton . . . . .	— 0 26	— 0 5	"
Kinsale . . . . .	— 0 18	— 0 4	Queenstown.
Courtmacsherry . . . . .	— 0 25	— 1 1	"
Castletownsend . . . . .	— 0 40	— 1 0	"
Baltimore . . . . .	— 0 38	..	"

From Bolt Tail to Start Point, at 4 miles off shore, the eastern stream sets at 3 hours after high water, and the western stream 3 hours before low water on the shore; the stream sets along the land, and its greatest velocity is  $2\frac{1}{4}$  knots. At neaps the turn of the stream is regular, varying from 4 to 7 hours after high and low water on the shore, the average being 5 hours. Its rate at neaps is  $1\frac{1}{2}$  knots: off Start  $2\frac{1}{4}$  knots.

Off Exmouth Bar, at three quarters of a mile, south of Straight Point, at full and change, the stream turns to the eastward at 3h. 40m. and to the westward at 11h. 0m., running in the latter direction about  $4\frac{1}{2}$  hours. The direction of the western stream for the first 2 hours is S.W.; for the next 2 hours west, and then turns gradually to the northward. The direction of the eastern stream for the first quarter is N.E.; at half-tide, E. by N.; and the greatest velocity of both streams is about 1 knot.

Three miles south of Beer Head, the stream turns to the westward at 1h. 30m., and runs in that direction 4 hours, then gradually turns to the northward and runs for 2 hours between W.N.W. and N.E. by N. It may be said to turn to the eastward about 5 o'clock, and for  $2\frac{1}{2}$  hours, until half tide, sets from N.E. to E. by N., and for the next 3 hours gradually turns to the southward. The direction of the tide in this position is, therefore, round the compass, with little or no velocity, as even springs it scarcely runs a knot, and that only for a very short period.

West Bay, at 2 miles N.N.W. of the Bill of Portland, at full and change, the tide begins to turn at 6h. 35m. and sets as follows: 1st hour of the ebb by the shore, at Portland Breakwater, S.  $\frac{1}{2}$  E.,  $1\frac{1}{2}$  knots. 2d hour, S.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  knots. 3d hour, S. by W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  knots. 4th hour, S.W. by S., three quarters of a knot. 5th hour, N.W.  $\frac{1}{2}$  N., nil. 6th hour, from N.N.W. to N.  $\frac{1}{2}$  W., three quarters of a knot. 7th hour N.E. to E. by N., 1 knot. 8th hour, S.E.  $\frac{1}{2}$  E.,  $1\frac{1}{2}$  knots. 1st hour of flood, S.E. by S.,  $1\frac{1}{2}$  knots. 2d, 3d, 4th, and 5th hours, S.S.E., 2 knots.

At  $2\frac{1}{2}$  miles S.E.  $\frac{1}{2}$  S. of the Bill of Portland, near the west end of Shambles, the 1st hour of the flood by the shore sets west, at the rate of  $1\frac{1}{4}$  to half a knot. 2d hour, E.  $\frac{1}{2}$  N., half a knot. 3d hour, by N.,  $2\frac{1}{2}$  knots. 4th hour, E.N.E.  $\frac{3}{4}$  E.,  $3\frac{1}{2}$  knots. 5th hour, east,  $1\frac{1}{2}$  knots. At the 1st hour of the ebb, E. by S.,  $3\frac{1}{2}$  knots. 2d hour, by S. to S.E. by S.,  $2\frac{1}{2}$  to  $1\frac{1}{2}$  knots. 3d hour, south, 1 knot. 4th hour, S.W. by S.,  $1\frac{1}{2}$  knots. 5th hour, W.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  knots. 6th hour, W. by S., 2 knots. 7th hour, W. by S.,  $2\frac{1}{4}$  knots. 8th hour, S.W.  $\frac{3}{4}$  W.,  $1\frac{1}{2}$  knots. N.B.—About a mile south of the Bill, at half tide, by the shore, the tide sets from S.S.E. to S.E.  $\frac{1}{2}$  E., and the opposite stream about W.S.W.  $\frac{1}{2}$  W.: the velocity of both streams, at springs, is from 5 to 6 knots; but although the tide runs with such violence near Race, about a mile S.W. of the Bill the tide was found very weak.

At 5 miles E.S.E. of the Bill of Portland, near the east end of the Shambles, the 1st hour of the flood by the shore sets west,  $1\frac{1}{2}$  knots.

2d hour, from West to N. by E., very weak. 3d hour about E.N.E., very weak. 4th hour, E. by N., 2 knots. 5th hour, E. by N.,  $2\frac{1}{2}$  knots. At the 1st hour of the ebb sets E.N.E.,  $3\frac{1}{2}$  knots. 2d hour, E.N.E.,  $3\frac{1}{2}$  knots. 3d hour, east,  $2\frac{1}{2}$  knots. 4th hour, east and E. by N.,  $1\frac{1}{2}$  knots. 5th hour, east, N. by W., and W. by N., very weak. 6th, 7th, and 8th, out west, from  $2\frac{1}{2}$  to  $2\frac{1}{4}$  knots.

In Portland and Weymouth Roads there is very little tide, so that the stream is scarcely sensible, and continues to be very moderate along the shore from Weymouth to St. Albans Head.

S.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{4}$  miles from St. Albans Head, the western stream, at full and change, makes at 10h. 45m., and the eastern stream at 1h. 45m.: the flood and ebb are of equal duration, the former setting N.E., and the latter from W.N.W. to N.W. by W.; their greatest velocity being at half tide from  $4\frac{1}{2}$  to  $4\frac{3}{4}$  knots.

At 1 mile S.E. of Durlstone Head, at full and change, the western stream makes at 10h. 25m., and the eastern stream at 4h. 25m., the former setting W.S.W., and the latter E.N.E.; their greatest velocity being about 3 knots: the indraught of the flood stream in thick weather might prove fatal to a ship not on her guard.

At a third of a mile E.S.E. of Peverel Point, at full and change, the western stream makes at 8h. 40m., and the eastern stream at 4h. 0m., the former setting S.W. and the latter N.E.; on the ebb there is a dangerous race over the Ledge, which extends about a mile off the Point. The velocity of the ebb stream is about 3 knots, and that of the flood about  $1\frac{1}{2}$  knots. Off Old Harry at three quarters of a mile N.E. by E. of Standfast Point, at full and change, the western stream makes at 9h. 45m., and the flood or eastern stream at 4h. 10m., the flood setting from N.E. by E. to N. by E. at the rate of 1 knot, and the ebb from S. by W. to S.W. 2 knots.

At the Needles, at full and change, the western stream makes at 10h. 0m., and the flood or eastern stream at 3h. 40m., and the velocity of both streams over the Bridge and in the South Channel is from 3 to 4 knots; but between Hurst Point and the Island,  $5\frac{1}{2}$  knots, and to the southward of the Bridge about 2 knots. In the Solent, the eastern flood stream makes at 4h., and near the Bramble at 4h. 30m.\*

In Freshwater Bay, about 1 mile S.W. of Brook Point, and the same distance off Atherfield Point, at full and change, the western stream makes at 10h. 25m., and runs at the rate of 1 knot, and the flood or eastern stream at 2h. 35m. from 2 to  $2\frac{3}{4}$  knots; both streams take the direction of the coast. W. by S.  $4\frac{1}{2}$  miles from St. Catherine Point, the western stream makes at 11h., setting N.W.  $\frac{3}{4}$  W. and the flood or eastern stream at 5h., in the opposite direction S.E.  $\frac{3}{4}$  E., the rate of both being from 2 to 4 knots; but at 1 mile W. by S. from the Point the streams set N.W. by N. and S.E. by S., 3 to 4 knots, and at two thirds of a mile S.S.W. of the Point, W. by N. and E. by S., with the same velocity.

Nearly 5 miles S.S.E. of Dunnose, at full and change, the stream turns at 10h. 40m. and 4h. 30m. and sets E.  $\frac{1}{2}$  S. and W. by N.; velocity, from 4 to 5 knots; but S.E., 2 miles from Dunnose, the flood sets E. by N., and turns at the same time as in Portsmouth Harbour, and the ebb W. by S., but one hour earlier than it does in the harbour.

Princessa. At the N.W. buoy, at full and change, the western stream makes at 10 o'clock, and runs 6 hours W.S.W.  $\frac{1}{2}$  W. The eastern stream commences at 4 o'clock, and sets very nearly in the opposite direction, E.N.E. At the S.E. buoy the tides are about half an hour later, and set as follows; viz., the western stream, first part, W.  $\frac{3}{4}$  S., gradually becomes more southerly, and at the last of the tide runs S.W. by S. The course of the eastern stream is pretty nearly the same throughout the whole of the tide, E. by N.

At the Nab Light Vessel, the tidal stream is nearly rotary, which is probably caused by the Spithead tide meeting the tide round Dunnose

\* In the Solent, and as far to the westward as Portland, there are what are termed the *first* and *second* high waters. This double high water is probably caused by the tidal stream at Spithead, for, as long as that stream runs strong to the westward the tide is kept up in Southampton water, and there is no fall of consequence until the stream begins to slack at Spithead, but when the stream makes to the eastward at Spithead the water falls rapidly at Southampton. After low water, the tides rise there pretty steadily for 7 hours, which may be considered as the *first* or proper high water; it then ebbs for an hour about 9 inches, at the end of which time it again commences to rise, and in about  $1\frac{1}{2}$  hours reaches its former level, and sometimes higher; this is called the *second* high water. To the mariner, the knowledge that the high water at Southampton remains nearly stationary for rather more than 2 hours may, in some cases, be important. Similar *first* and *second* high waters occur on either shore of the Solent, as shown in the times of high water at full and change, page 149.

At Havre, on the French coast, the high water remains stationary for one hour, with a rise and fall of 3 or 4 inches for another hour, and only rises and falls 13 inches for the space of 3 hours; this long period of nearly slack water is very valuable to the traffic of the port, and allows from 15 to 16 vessels to enter or leave the docks on the same tide.

PORTS OF GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Southampton . . . . .	— 1 11	..	Portsmouth.
West Cowes . . . . .	— 0 56	..	..
Hurst Camber . . . . .	— 1 41	..	..
Needles Point . . . . .	— 1 55	..	..
Christchurch . . . . .	— 2 41	..	..
Poole . . . . .	— 2 31	..	..
Portland Breakwater . . . . .	— 4 40	— 5 10	..
Lyme Regis . . . . .	+ 0 38	..	Devonport.
Exmouth . . . . .	+ 0 38	..	..
Torbay . . . . .	+ 0 17	..	..
Dartmouth . . . . .	+ 0 33	..	..
Plymouth Breakwater . . . . .	— 0 6	..	..
East Looe . . . . .	— 0 17	..	..
Fowey . . . . .	— 0 29	..	..
Falmouth . . . . .	— 0 46	..	..
Penzance . . . . .	— 1 13	..	..
Scilly Isles (St. Mary) . . . . .	— 1 16	..	..
WESTERN COAST OF EUROPE.			
Gibraltar . . . . .	— 1 27	..	Brest.
Cadiz . . . . .	— 2 2	..	..
Lisbon (Bar) . . . . .	— 1 17	..	..
Oporto . . . . .	— 1 17	..	..
Ferrol . . . . .	— 0 47	..	..
Santander . . . . .	— 0 17	..	..
Bayonne . . . . .	— 0 2	..	..
Arcachon . . . . .	+ 0 50	..	..
Tour de Cordouan . . . . .	— 0 10	..	..
Bordeaux . . . . .	+ 3 3	..	..
Ile d'Aix . . . . .	— 0 27	..	..
Ile d'Yeu . . . . .	— 0 41	..	..
Ile de Noirmoutier . . . . .	— 0 45	..	..
Port Navalo . . . . .	— 0 5	..	..
St. Nazaire . . . . .	— 0 7	..	..
Belle Ile . . . . .	— 0 29	..	..
Port Louis . . . . .	— 0 36	..	..
Port Concarneau . . . . .	— 0 35	..	..
Ile de Sein . . . . .	— 0 26	— 1 9	..
Ouessant (Ushant) . . . . .	— 0 15	— 0 1	..
NORTHERN COAST OF EUROPE.			
Abervrach . . . . .	+ 0 27	..	Brest.
Morlaix . . . . .	+ 1 6	..	..
Plougrescan . . . . .	+ 1 30	..	..
Bréhat . . . . .	+ 2 4	..	..
St. Malo . . . . .	+ 2 18	..	..
Granville . . . . .	+ 2 26	..	..
Ile de Chausey . . . . .	+ 2 22	..	..
Jersey (St. Helier) . . . . .	+ 2 38	..	..
Guernsey (St. Peter Port) . . . . .	+ 2 50	..	..
Ecrehous . . . . .	+ 2 45	..	..

NORTHERN COAST OF EUROPE.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Alderney . . . . .	+ 2 59	..	Brest.
Cherbourg . . . . .	+ 4 2	..	"
Barfleur . . . . .	+ 5 4	..	"
La Hougue . . . . .	+ 4 55	..	"
Honfleur . . . . .	+ 5 42	+ 4 3	"
Quillebœuf . . . . .	+ 6 19	— 9 7	"
Havre . . . . .	+ 6 4	..	"
Fécamp . . . . .	+ 6 57	+ 4 2	"
Dieppe . . . . .	+ 7 19	..	"
Cayeux . . . . .	+ 7 18	..	"
Boulogne . . . . .	+ 0 13	..	Dover.
Cape Grisnez . . . . .	+ 0 15	+ 2 4	"
Calais . . . . .	+ 0 37	+ 0 10	"
Dunkerque . . . . .	+ 0 56	..	"
Nieuport . . . . .	+ 1 6	..	"
Ostend. . . . .	+ 1 13	..	"
Flushing . . . . .	+ 2 8	..	"
Antwerp . . . . .	+ 5 13	..	"
Hellevoetsluis . . . . .	+ 3 18	..	"
Rotterdam . . . . .	+ 4 33	..	"
Helgoland . . . . .	— 0 33	— 2 10	Harwich.

#### SET OF THE TIDES ALONG THE SOUTH COAST OF ENGLAND.

The tides about Plymouth Sound are tolerably regular, both flood and ebb, generally running each way about six hours and ten minutes at a mean. In Hamoaze the flood stream continues to run up, on spring tides, about fifteen minutes after high water at Devonport Dock-Yard.

It is high water in Catwater rather earlier than at the Dock-Yard; but with strong winds from the southward and westward the tide flows half an hour longer in both harbours.

At the Breakwater in Plymouth Sound it is high water a few minutes earlier than at the Dock-Yard, but the stream drains in for a short time after the water has ceased to rise.

Abreast of Plymouth Sound, about 6 miles from the land, the streams are very irregular and do not turn with the tide farther out in the offing. One hour and three-quarters before high water at the Dock-Yard the stream makes to the eastward and runs about E. by S. for one hour; during the next hour it is scarcely sensible, after which it turns to the southward, gradually changing to W.S.W. till the last quarter of the ebb on the shore, when it veers from W.S.W. to W.N.W. During the first 3 hours flood on the shore, its direction changes from W.N.W. to N.W., when it begins to slacken, and to set about North, till at the last  $4\frac{1}{2}$  hours flood it runs E. by S. as at first.

Four miles south-west of the Eddystone the stream begins to run E. by S. when it is high water at the Dock-Yard, and continues about two hours and three-quarters, when it slacks and shifts to the southward. At  $3\frac{1}{4}$  hours ebb on the shore it sets W.S.W.; at 4 hours W. by N.; and then W.N.W. until low water. During the first 2 hours flood on the shore the stream sets N.W. by W., and loses its strength during the third hour, running N.W. and North. During the fourth hour, what little stream there is sets N.N.E. and N.E.; and then E.N.E. and E. by N. till about high water, when its direction is E. by S.

Near the Norfolk and Suffolk coasts the streams of tide run nearly parallel to the shore. Off Wells the flood runs to the eastward till clock, or three hours after high water on the shore.

Four miles off Cromer, and the same distance off Hasborough, the flood runs along shore to the southward till 10h. 15m., or 1h. 45m. after high water at Harwich, and the ebb in a contrary direction.

At 2½ miles off Lowestoft the flood stream continues to run to the W. till 1h. 30m. before high water at Harwich.

At Orfordness the flood stream continues to run till about high water at Harwich Harbour; the flood sets W.S.W., and the ebb E.N.E.

At Margate it is high water about 11h. 40m. by the ground. Near

East buoy of Margate Sand, at the first of the flood, on the shore the stream sets S. by W., veering westward, till about half flood, or 15m., it sets west, and continues veering, till at high water it falls slack at N.N.W. The ebb stream begins at N.E., veering eastward, increasing in strength till about half ebb, or 2h. 45m., when it is S.E. by E., still veering, and the latter part with diminished velocity, till at low water it falls slack at south.

In the River Medway the flood stream runs up in mid-channel from twenty to twenty-five minutes after high water at Sheerness Dock-Yard; at the Nore Light Vessel, although it is high water by the ground a few minutes earlier than at the Dock-Yard, yet the stream runs up the river for half an hour after high water at the Yard.

It remains to be noticed that the direction of strong winds, as well as the varying pressure of the atmosphere, considerably affect both the times and the heights of high water. Thus in the North Sea a strong E.W. gale and a low barometer raise the surface 2 or 3 feet higher, and cause the tide to flow all along the coast from the Pentland Firth to London half an hour longer than the times and heights predicted in the Tables. Easterly, S.E., and S.W. winds produce opposite effects, which will be felt as far down the Channel as Dungeness. On the contrary, at the entrance of the Channel, at Plymouth, and as far up as Portland, south-westerly winds, with a low barometer, raise the surface of the water; and north-easterly winds and a high barometer always lower it.

The winds affect also the locality of the meeting of the North Sea and Channel tides: during moderate breezes this takes place somewhere between the North Foreland and the north end of the Goodwin Sands, the southward, and between the Kentish Knock and the Galloper to the northward; but both these places of meeting are liable to be removed either south or north by strong northerly or south-westerly winds.

## THE TIDES AMONG THE ORKNEYS.

By COMMANDER F. W. L. THOMAS, R.N.

The great rapidity of the tidal streams among the Orkneys makes *General* correct knowledge of their periods and velocities of the utmost *Remarks.* importance to the mariner.

In the terrific gales which usually occur four or five times in every year, all distinction between air and water is lost, the nearest objects are obscured by spray, and everything seems enveloped in a thick smoke; upon the open coast the sea rises at once, and striking upon the rocky shores, rises in foam for several hundred feet, and spreads over the whole country.

The sea, however, is not so heavy in the violent gales of short continuance as when an ordinary gale has been blowing for many days; the whole force of the Atlantic is then beating against the Orkadian



shores, rocks of many tons in weight are lifted from their beds, and the roar of the surge may be heard for twenty miles; the breakers rise to the height of sixty feet, and on the North Shoal, which lies 8 miles N.W. of Costa Head, the broken sea is visible even at Skail and Birsá.

Similar effects may be witnessed in any stormy region, but here they are increased by the power of the tidal stream, and when the whole mass of water is in motion, a very slight inequality at the bottom of the sea is indicated by a ripple on the surface, so that by these means I have detected shoal spots (to the eastward of North Ronaldsha) at a depth of 47 fathoms, though the difference in depth was but 20 feet. On the rocky bank of the North Shoal, which is about 4 miles in length, the ripple readily distinguished any inequality of 10 and 15 feet, at a depth of 30 fathoms, even when the stream was moving but one mile per hour. It is only in calm or very fine weather that these rippings can be observed, but when the wind increases upon a weather tide the sea will break over every inequality of the sea bottom. These broken seas are dangerous, and during the survey of these Islands I have often been in great peril from moving the ship before sufficient time had elapsed for the sea to become quiet.

The body of the tide-wave comes from the N.W., and makes high water on the whole west coast of the Orkneys at nearly the same time; the establishment for Stromness being 9 o'clock, and that for Pierowall in Westra, is about 6 minutes later. At the north-east end of the Orkneys it is but a few minutes later than at the north-west, as the establishment for Otters Wick is 9h. 13m.; but the tide there is probably retarded by having to pass over the shoal water at the mouth of the bay.

On the south-east side of the Orkneys, in Holm Sound, the high water there being derived from the tide-wave entering by the Pentland Firth takes place about 9h. 35m.

The vulgar establishment, or time of high water, full and new moon, varies greatly; the mean of nine observations at Otters Wick gives 9h. 13m., but they vary between 8h. 58m. and 9h. 42m.

When the tide has to pass through a narrow or shallow channel, the retardation is very great; thus it is high water an hour earlier at the mouth of Eynhallow Sound than at Kirkwall, though the distance is but 11 miles; and by levelling across Sanda (about half a mile), it appeared that when it was high water at Otters Wick, the sea-level was 4 feet 8 inches above the sea level of Catasand, and that high water was 1h. 43m. later at Catasand than at Otters Wick.

The mean range of tide at springs in the North Isles of the Orkneys is 11 feet 2 inches, and at neaps 5 feet 6 inches.

Extraordinary springs may be 3 feet 4 inches above or below the mean; this result is greatly increased by the semidiurnal inequality; for in some instances the difference in the rise of two consecutive tides has been observed to amount to 2 feet 10 inches.

In the South Isles the mean range at springs is about 1 foot less than in the North, being 10 feet; at neaps 5 feet.

The passage from the westward round the North end of the Orkneys is rendered somewhat treacherous by the peculiar set of the tide; for the body of the flood stream coming from the north-west, a ship must be 6 or 7 miles to the northward of the Mull of Papa to drift clear of North Ronaldsha. The first half of the flood sets from the Mull right for North Ronaldsha (S.E. b. E.  $\frac{1}{2}$  E.), and should the wind fail while the flood is running, there would be a great probability of drifting ashore.

The flood stream passes slowly the North coast of Westra (sending a weak offset between Papa and Aikerness), and joins the main

cam off Moul Head, where a bore or *röst*\* is formed, which stretches several miles to sea. The tide here runs about 6 knots; between Papa North Ronaldsha 3 knots; but near North Ronaldsha the rate increases to 6 knots, passing over the Altars of Linnay and Sealerry with great violence. The flood splits on the West coast of the Ronaldsha with the Established Kirk (the southernmost) in one small byre; and should a vessel be drifting down on the island, should endeavour to pass to the southward, when she will go clear everything.

Off Seal Skerry there is a bad *röst* with southerly winds, and the tide runs at six knots between that point and Dennis Head; it does not, however, touch the shore, but leaves a small eddy or counter-tide, where boats can turn up as far as the Skerry.

The tide sets strongly between Fair Isle and the Orkneys. For on one occasion having Dennis Head bearing S.  $\frac{1}{2}$  E. distant 8 miles, the vessel having set S.E.  $\frac{3}{4}$  S. for three hours, and being then high water on the shore, it shifted its direction  $3\frac{1}{2}$  points; that is, it set South for the next three hours, or until it was half-ebb on the shore, its greatest rate being then 3 to 4 knots. An hour before this, the vessel's track began to take a curved form, which continued to grow sharper as the force of tide decreased, so that without any stopping, we found ourselves drifting with the ebb stream North, and parallel to, but at the distance of 2 miles from, our former track. The ebb stream continued steadily north for four hours, running 2·8 at its strength, after which it began to curve to the eastward; the stream thus appearing to describe a long spiral, and revolving in the direction of the hands of a watch.

It also appears that when it is half-flood on the shore, it is slack water in the stream; that when it is low water on the shore, the flood stream is running strongest, but changing its direction from S.E.  $\frac{3}{4}$  S. to South, and that the reverse happens during ebb tide.

These observations will show how little dependence can be placed on a direct course among these treacherous tides; and those who have been beating about for some days against a head wind are particularly exposed to this danger. It is a common remark with the people of North Ronaldsha, that all vessels come ashore with the flood tide; and it is readily seen how this takes place, for the accident of it being either flood or ebb tide will make a difference of between 30 and 40 miles in position.

The flood stream from Runabrage sets into North Ronaldsha firth at the rate of 3 knots; from the Holms of Eyre it sets over the Baas of Evan, and both streams passing through the firth at the rate of 4 knots, continue to run two hours after high water on the shore.

Off the Start the first of the flood sets to the southward at 4, but changes, as the stream grows older, to S.W. There is an extremely bad *röst* off the Start with southerly winds and flood tide; it stretching for 4 miles to sea, but being heaviest near the shore.

Between Westra and Sanda the stream is scarcely sensible, but gathers strength as it approaches Calf Sound and Lashy Sound, it then flows through those narrow passes at the rate of 6 knots; but decreasing to 2 or 3 knots in Eda Sound, where the stream falls into the Ronaldsha Firth. In those Sounds the stream runs  $1\frac{1}{2}$  hours after it is high water on the shore.

In Spurness Sound the tide begins to the eastward half-an hour before it is low water on the shore, or  $1\frac{1}{2}$  hours before it is low water in the bay, and turning every six hours. This stream is like a mill-race in

*Bore off Papa,  
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*Seal Skerry  
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*Tide Streams  
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*Tide and half-  
tide.*

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*Calf and Lash  
Sounds.*

*Spurness  
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*Röst* (pronounced reust) a Scandinavian word, meaning a roaring, broken, tidal sea.

the narrows when passing Spur Ness, but it speedily becomes in Sanda Sound, and off Kettleaft it scarcely runs 2 knots.

*Stronsa and  
Westra Firths.*

In the Stronsa and Westra Firths, which form one continuous nearly straight channel, the tide stream is very rapid, as through Enghallow Sound the body of the ocean tide is discharged.

*North Shoal.*

At the North Shoal, which is 15 miles from the entrance of the tide sets W. by S. (towards the entrance), and at springs runs 2 miles an hour; neaps about one.

*Brough of  
Birsä.*

Along the coast of West Mainland, or Pomona, the stream is sensible off the points; but off the Brough of Birsä the flood sets to the northward for two hours after it is high water on land when its greatest rate is 2 knots.

*West coast of  
Rousa.*

From the Brough of Birsä the flood sets along shore for Costa Head, increasing in velocity as it approaches the West coast of Rousa. The influence of the indraught through Eynghallow Sound is scarcely felt beyond a line joining Costa Head and the Reef of Gairra.

*Skea Skerries*

The flood stream runs South along the West coast of West Mainland to the point of Skea, and over the Skea Skerries. Between them and Rousa the stream acquires great force, even 6 knots; it does not turn for two hours after high water on the shore.

*Kili Holm.  
War Ness.*

The weight passes close round Kili Holm, and crosses for War Ness South Point of Eda,) and the Greenholms.

*Stronsa Firth.*

At War Ness the tide stream runs 7 knots, and the röst is commotion during southerly gales and spring flood. At that time the Sound between the Gio Ness of Shapinsha and War Ness is in commotion, and when bound to Stronsa, a line of breakers may sometimes be seen roaring and foaming within half a cable's length vainly looking for a gap or smooth.

The main stream from War Ness, joined by the Stream from Eda, sets past Rousholm Head, and clear of Auskerry to the open sea from the Greenholms, past Shapinsha and Deerness, where it is by the String, the usual name for the direct run of the stream from Enghallow Sound by Gairra, Eller Holm, and Deerness. Its rate between Shapinsha and Rousholm is 6 knots, and between the Mull of Gairra and Auskerry about 4 knots.

*Weatherness  
and Fara Ness  
Sounds.*

The tides in Weatherness and Fara Ness Sounds are peculiar; the stream turns to the eastward as soon as the tide has ceased to set on the shore; that is, the flood stream makes  $2\frac{1}{2}$  hours before it reaches Westra Firth. The stream pours through the narrows of Westra and Fara Ness Sounds at the rate of 4 knots, and then sets very strong towards Calf Sound.

*Egilsha and  
Shapinsha.*

A very weak stream runs south through Howan Sound during flood, and it is also weak on the East side of Egilsha; for the body of the stream goes transversely across the channel, and leaves comparatively still water along Egilsha and the North side of Shapinsha.

*Eynghallow  
Sound.*

The flood stream from Costa Head and the reef of Quenea runs towards Eynghallow, and divides there, passing Burgher and Race at the rate of 7 knots; the streams unite when past the island, and do not average more than 4 knots down Eynghallow Sound.

*Wyre Sound.  
Swine Holm.*

A very weak stream passes eastwards through Wyre Sound, and another South of Wyre island; but off Swine Holm, where the stream unites with that from the Westra Firth, the rate scarcely exceeds 2 knots. In the narrow channels among the group of Holms Gairra and Shapinsha, the flood sets southerly 6 knots.

*Between Gairra  
and Shapinsha*

The main stream from Eynghallow Sound passes S. of Gairra thence transversely to Stromberry Head, and on through Strom Sound. The tide stream is narrow in its passage between War Ness and Eller Holm, nor does the *String* expand for some distance.

*and by Work  
Head.*

passing that place; the rate at springs is about 3 knots, and the stream does not turn till  $1\frac{1}{4}$  hours after high water on the shore.

The flood-stream running through Hoy Sound commences on the North Side at the Millstone Quarry, 4 miles from Hoy Mouth, and on the South from Hoy Head; the indraught is scarcely felt 5 miles outside the entrance.

In Hoy Mouth the rate of the stream is 4 knots, until it divides upon Gremsa, when the rate increases to 6 knots; one stream passing through Burwick Sound, the other between Gremsa and Stromness. The tide goes over the Skerry Ness, and from thence sets fair for the kerries of Clestron, where it divides, one stream running up and filling the Bay of Ireland, and at half flood setting as a back-tide out of Hirston Road; the other setting rather off shore at first, and then towards Houton Head. From Burwick Sound the stream sets along the shore of Hoy to Green Head, the rate being scarcely 3 knots; and Gremsa causes a large arrear of slack water in the middle of the Sound. After passing Houton Head, the flood stream becomes diffused in Scapa Flow, and is only sensible off that point; its general direction towards Holm Sound, and at the Barrel of Butter it scarcely runs 3 knots at springs. On the West side of Holm the stream drains along shore to Halcrow Head, where it meets the stream from the Pentland Firth.

The tide stream runs with greater velocity and turbulence through the Pentland Firth than in any other part of the Orkneys; so that with a strong gale and a weather spring-tide the sea is in many places impassable, and after the wind has gone down, the sea continues to break with great violence for some days, indeed in a sailing ship more dangerous to be apprehended from a calm than from a gale of wind. The tide comes from the Atlantic, opposed by the West coast of the Orkneys, is pressed against the shores of Caithness, where at Thurso the tide rises nearly 5 feet higher than at Stromness, though the latter is but 20 miles to the northward. This accumulated mass of water finds egress through the Pentland Firth, where the velocity of the stream near the Little Skerry, as said by Captain Otter to have acquired the rate of 10 knots. At the Great and Lother Skerries, which resist a large body of the tidal stream, the water is sensibly higher by 1 or 2 feet upon the stream side, and a small rapid is formed, of little height indeed, but of great power. Vessels that have drifted upon this rock, when covered by the tide, have been rolled over it, and sunk in deep water on the other side.

The establishments of the following places in the Pentland Firth were determined by Captain Otter:—

*Establishments.*

PLACES.	High Water.	Rise above the Spring L.W.				Range, or Rise between L.W. and H.W.				REMARKS.
		Spring.		Neap.		At Springs.		At Neaps.		
Thurso, Scrabster Road -	h. m.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	Deduced from 4 years observations.	
Uncanaby Ness -	8 28	14 10	11 0	14 10	5 6	14 10	5 6	14 10		
Gremsa, South Side -	10 14	10 0	8 6	10 0	4 0	10 0	4 0	10 0	Mean of 19 comparisons, but very irregular.	
Gremsa, East Side -	9 47	9 0	7 6	9 0	4 0	9 0	4 0	9 0		
Gremsa, West Side -	10 24	-	-	-	-	-	-	-	Mean of 12 comparisons with Thurso.	
Pentland Head, Great Skerry, East Side -	9 35	-	-	-	-	-	-	-		
Pentland Head, Great Skerry, West Side -	11 4	9 3	8 0	9 3	3 0	9 3	3 0	9 3	Mean of 33 comparisons with Thurso.	
Idowall -	10 53	-	-	-	-	-	-	-		
Idowall -	9 3	-	-	-	-	-	-	-	Mean of 7 comparisons with Thurso.	

The directions as well as the velocities of the tidal streams in Pentland Firth vary with the hour of the tide; and in almost every case the flood takes a more southerly direction as the tide grows and the contrary with the ebb.

*Rate.* The flood stream comes South along the shore of Hoy, and East along the coast of Caithness; and the indraught increases in approaching the entrance. Between Turn Ness and Dunnet Head the usual rate is 7 knots, but as they round the South end of Swona and the end of Stroms, it rises to 9 knots, and when rushing past the Great Lothar to 10. About  $1\frac{1}{2}$  hours after it is high water on the shore the flood stream makes strong along the coast of South W. curving to the northward of Swona, washes the Great Lothar and passes to the northward of the Pentland Skerries.

*Direction.* At a later period of the tide, the stream from Brims Ness goes to the South end of Swona and to the Southward of the Pentland Skerries; so that after it is half flood in the stream (equal to high water on the shore), if a ship is a mile to the southward of Brims Ness, she may pass a mile to the southward of Swona, and the same distance southward of the Skerries.

*Hoxa Sound.* From Cantick Head the flood stream sets past Stangar Head, crossing Hoxa Sound divides on the Lime Kiln; one very weak stream setting to the southward along South Ronaldsha, while the other about 4 knots towards Water and Holm Sounds.

*Holm Sound.* Through Holm Sound the rate of the stream is 6 knots where it turns at one hour after it is high water on the shore.

*Water Sound.* Through Water Sound is 4 knots.

*Cantick Sound.* From Cantick Head a weak stream runs northwards, filling Hope and the bays on the east side of Hoy, and finding outlets at Gutter and Weddel Sounds; the rate at springs in the narrowest of these Sounds is 2 knots.

*East side of Hoy.* Between Cantick Head and Swona the general direction of the stream is towards South Ronaldsha, and southward between it and Barth Head; but it is almost impossible to predict exactly what direction a vessel would take; with Barth Head open North of Swona, at quarter flood would send her to the northward of that island, and at the mid-channel between it and South Ronaldsha; but the flood would probably press her too close to Barth Head, and perils her to the Great Lothar.

*Pentland Firth; round Swona ;* The first of the flood stream from Widewall sets direct East of Barth Head and the Lothar, so that in light winds vessels should in passing pass as near to the North Head of Swona as possible. As a rule, if a ship, having left Widewall with light winds and flood, should drift nearer to Swona than Barth Head, she will be clear of the Lothar—if nearer to Barth Head, she will go too close to the rock.

*from Widewall.* When the flood stream first makes at the north head of Swona it first sets across the channel, but presently turns to the southward clear of the Lothar, and then to the northward of the Pentland Skerries; but after half flood in the stream, equal to high water on the shore, the stream from the north end of Swona bends round to the southward of these islands, and consequently, at a certain period of the tide, it flows towards them.

*Pentland Skerries.* Between the Lothar and the Skerries the flood stream sets far from the sea, about E.S.E., joining the main stream from Stronsa Firth.

From the South end of Swona the first flood sets right on to the Skerry, dividing there, and running 7 knots close to the North shore. On the South side the stream sets off (leaving a narrow eddy in the first) towards the Little Skerry, but it gradually curves and goes

stream off Moul Head, where a bore or *röst*\* is formed, which stretches several miles to sea. The tide here runs about 6 knots; between Papa and North Ronaldsha 3 knots; but near North Ronaldsha the rate again increases to 6 knots, passing over the Altars of Linnay and Seal Skerry with great violence. The flood splits on the West coast of North Ronaldsha with the Established Kirk (the southernmost) in one with a small byre; and should a vessel be drifting down on the island, she should endeavour to pass to the southward, when she will go clear of everything.

*Bore off Papa,  
Rate of Tide.*

Off Seal Skerry there is a bad *röst* with southerly winds, and the tide runs at six knots between that point and Dennis Head; it does not, however, touch the shore, but leaves a small eddy or counter-tide, where boats can turn up as far as the Skerry.

*Seal Skerry  
Röst.*

*North  
Ronaldsha.*

*Tide Streams  
between Fair  
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The tide sets strongly between Fair Isle and the Orkneys. For on one occasion having Dennis Head bearing S.  $\frac{1}{4}$  E. distant 8 miles, the flood having set S.E.  $\frac{3}{4}$  S. for three hours, and being then high water on the shore, it shifted its direction  $3\frac{1}{2}$  points; that is, it set South for the next three hours, or until it was half-ebb on the shore, its greatest rate having been 3 to 4 knots. An hour before this, the vessel's track began to take a curved form, which continued to grow sharper as the rate of tide decreased, so that without any stopping, we found ourselves drifting with the ebb stream North, and parallel to, but at the distance of 2 miles from, our former track. The ebb stream continued steadily North for four hours, running 2.8 at its strength, after which it began to curve to the eastward; the stream thus appearing to describe a long oval, and revolving in the direction of the hands of a watch.

It also appears that when it is half-flood on the shore, it is slack water in the stream; that when it is low water on the shore, the flood-stream is running strongest, but changing its direction from S.E.  $\frac{3}{4}$  S. to South, and that the reverse happens during ebb tide.

*Tide and half-  
tide.*

These observations will show how little dependence can be placed upon a direct course among these treacherous tides; and those who have been beating about for some days against a head wind are particularly exposed to this danger. It is a common remark with the people of North Ronaldsha, that all vessels come ashore with the flood tide; and it is readily seen how this takes place, for the accident of it being either flood or ebb tide will make a difference of between 30 and 40 miles in position.

The flood stream from Runabrage sets into North Ronaldsha firth at the rate of 3 knots; from the Holms of Eyre it sets over the Baas of Trevan, and both streams passing through the firth at the rate of 4 knots, continue to run two hours after high water on the shore.

*North  
Ronaldsha  
Firth.*

Off the Start the first of the flood sets to the southward at 4, but changes, as the stream grows older, to S.W. There is an extremely bad *röst* off the Start with southerly winds and flood tide; it stretching 3 or 4 miles to sea, but being heaviest near the shore.

*Start of Sanda.*

*Röst.*

Between Westra and Sanda the stream is scarcely sensible, but gathering strength as it approaches Calf Sound and Lashy Sound, it rushes through those narrow passes at the rate of 6 knots; but decreasing to 2 or 3 knots in Eda Sound, where the stream falls into the Stronsa Firth. In those Sounds the stream runs  $1\frac{1}{4}$  hours after it is high water on the shore.

*Calf and Lash  
Sounds.*

In Spurness Sound the tide begins to the eastward half-an hour before it is low water on the shore, or  $1\frac{1}{4}$  hours before it is low water in the stream, and turning every six hours. This stream is like a mill-race in

*Spurness  
Sound.*

\* *Röst* (pronounced reust) a Scandinavian word, meaning a roaring, broken, tidal sea.

during ebb tide, which before the tide is done almost reaches as far as Cantick Head.

*Eddy of  
Stroma.*

The ebb stream sets fairly through the Firth from the North end of Stroma till it meets the stream coming from Inner Sound and incloses a large eddy; at half tide these united streams set over toward Turn Ness, where the last of the ebb tide drains, while there is comparatively still water on the South side, between Dunnet Head and St. Johns Point.

It does not appear necessary to follow the course of the ebb stream throughout the Orkneys, as in almost every case it is the reverse of the flood, nor to enter into detail of those phenomena which are common to all masses of water in motion, and which any one, by observing the directions of the channels and the apparent obstructions of the several streams, can learn from the chart.

### REMARKS ON THE SET OF THE TIDAL STREAMS IN THE IRISH AND ENGLISH CHANNELS, AND IN THE NORTH SEA.—BY REAR-ADMIRAL F. W. BEECHEY, F.R.S.

*The Common  
Standard for  
the turn of the  
Streams*

A CAREFUL investigation of the tides in the Irish Channel, the English Channel, and in the North Sea, has shown the possibility of referring the movements of the several streams to a common standard, instead of resorting to the troublesome process hitherto in use, of comparing the motion of the streams with the varying times of high water along the coast.

*is High Water  
at Dover and  
Liverpool.*

For the entrance of the English Channel and North Sea the time of high water at Dover may be considered the standard; and for the whole of the Irish Channel, the time of high water on the shore at the entrance of Liverpool.

*Off mouth of  
English  
Channel.*

Off the mouth of the English Channel the stream, although materially influenced by the indraft and outset of the Channel, will be found running to the *northward and eastward*, while the water is *falling* at Dover; and to the *southward and westward* while it is *rising* at that port. The particular direction given to the stream in this part of the sea, by the meeting of the Channel and of the offing tides, will be shown in the following table (Compartment I.); and it is only necessary to mention here, that to the southward of the parallel of Scilly, the tides of the Channel and offing blend together with varying force and direction, and occasion the stream to be constantly changing, and in some places even to make the entire circuit of the compass in one tide, without ever remaining long upon any one point. So that any written description of their course is rendered almost impossible, and the table alone must be consulted for the direction at any particular hour. From this revolving motion of the stream, it has been asserted that a vessel can never be carried far in any one direction by the tide. Such, however, is not the case; for, although it may be true that while at anchor in a particular spot the vessel's head will turn to every point of the compass, yet directly she is loose she will be carried away upon a rhomb depending upon the state of the tide at Dover.

*South of Scilly.*

*Bristol Channel.*

From the parallel of Scilly to the Bristol Channel the stream is more regular, and while the water is *falling* at Dover, will be found setting to the *northward*: near the coast partaking of the direction of the shore, and turning sharply round Trevoise Head and Hartland Point into the Bristol

annel; and while the water is *rising* at Dover, setting as sharply out the Bristol Channel and along the land towards Scilly.

By many observations, the Light vessel at the Seven Stones has been found to swing to the *northern* tide 7 minutes after high water at Dover; but at Trevoose Head the northern tide to make 12 minutes after Dover. As a vessel advances up the Bristol Channel the stream turns progressively later. The tides of that estuary do not follow the same law as the tides of channels which are open at both extremities. The motions of the stream in the Bristol Channel will be given hereafter; present I wish to draw the attention of the seamen to the particular fact, that while the stream from Scilly is setting to the *northward* the stream from the Irish Channel will be found setting to the *southward*, and that these streams meet off the entrance of the Bristol Channel in about parallel of  $51^{\circ}00$  where both turn into that channel. As a general rule, in all the space eastward of a direct line joining Scilly and the Tuskar, the stream will be found *running* to the eastward towards the Bristol Channel, while the water is *falling* at Dover and Liverpool, and *versâ*, setting to the *north-east* on the southern side of the Channel to the *south-east* on the northern side. Such is the general set of the stream in this part of the sea, which I have given in general terms how that to the eastward of the line above mentioned a strong indraftwards the Bristol Channel will always be experienced while the water is *falling* at Liverpool, and *vice versâ*. To the westward of this line the stream appears to be slack; but we are in want of further observations in this part before any particulars can be entered into. Towards Cape Clear the northern stream from Scilly seems to join the southern and western streams from the Irish Channel, and both pass to the north-west and Cape Clear, and *vice versâ*.

At the Smalls Lighthouse it is slack water 5 minutes before high water at the entrance of Liverpool; the stream sets past the rock of S. by W.  $\frac{1}{2}$  W. direction while the water is *falling* at Liverpool, N. by E.  $\frac{1}{2}$  E. while it is *rising* there, veering to N. by E. during the two last hours of the tide. The strength of the tide is sensibly felt about and all the way from the Smalls to Pembroke, running upwards of  $3\frac{1}{2}$  or 4 knots at the height of the springs. To the southward of the Smalls the stream sweeps round in a broad curve to the S.E., and enters the Bristol Channel while the water is *falling* at Liverpool and *versâ*, as before stated. The *entrance of Liverpool* is properly the point to which the turn of the stream in these pages is referred, wherever a reference is made to that place it must be understood as being 18 minutes *earlier* than the time of high water at St. Georges, to which the tide tables are adapted.

On the Irish side, at the Saltees Lightship, for instance, the water slack 22 minutes before it is high water at Liverpool entrance. The stream sets W.S.W. from a quarter of an hour before high water at Liverpool entrance to  $1\frac{1}{2}$  hours after, and then W.N.W. to low water. At flood or *rising tide* at Liverpool sets past the Saltees for the 3 hours E. by S., then E.S.E. for the 2 next hours, and S.E. by E. the last hour, when the tide slackens, as before, 22 minutes before high water at Liverpool entrance.

From the Saltees Lightvessel to the Tuskar the stream sets along the land, but towards Carnsore Point begins to tend to the northward on flood, and finally sets sharply round that point into the Irish Channel, and must be carefully watched by vessels in this situation.

Seven Stones.

Meeting of the Stream in  $51^{\circ}$  N.

Streams between Scilly and Tuskar.

Off S. coast of Ireland.

Off the Smalls.

Off the Saltees.

Off Carnsore Point.



during ebb tide, which before the tide is done almost reaches as far as Cantick Head.

*Eddy of  
Stroma.*

The ebb stream sets fairly through the Firth from the North end of Stroma till it meets the stream coming from Inner Sound and incloses a large eddy; at half tide these united streams set over toward Turn Ness, where the last of the ebb tide drains, while there is comparatively still water on the South side, between Dunnet Head and St. Johns Point.

It does not appear necessary to follow the course of the ebb stream throughout the Orkneys, as in almost every case it is the reverse of the flood, nor to enter into detail of those phenomena which are common to all masses of water in motion, and which any one, by observing the directions of the channels and the apparent obstructions of the several streams, can learn from the chart.

# REMARKS ON THE SET OF THE TIDAL STREAMS IN THE IRISH AND ENGLISH CHANNELS, AND IN THE NORTH SEA.—BY REAR-ADMIRAL F. W. BEECHY, F.R.S.

*The Common  
Standard for  
the turn of the  
Streams*

A CAREFUL investigation of the tides in the Irish Channel, the English Channel, and in the North Sea, has shown the possibility of referring the movements of the several streams to a common standard, instead of resorting to the troublesome process hitherto in use, of comparing the motion of the streams with the varying times of high water along the coast.

*is High Water  
at Dover and  
Liverpool.*

For the entrance of the English Channel and North Sea the time of high water at Dover may be considered the standard; and for the whole of the Irish Channel, the time of high water on the shore at the entrance of Liverpool.

*Off mouth of  
English  
Channel.*

Off the mouth of the English Channel the stream, although materially influenced by the indraft and outset of the Channel, will be found running to the *northward and eastward*, while the water is *falling* at Dover; and to the *southward and westward* while it is *rising* at that port. The particular direction given to the stream in this part of the sea, by the meeting of the Channel and of the offing tides, will be shown in the following table (Compartment I.); and it is only necessary to mention here, that to the southward of the parallel of Scilly, the tides of the Channel and offing blend together with varying force and direction, and occasion the stream to be constantly changing, and in some places even to make the entire circuit of the compass in one tide, without ever remaining long upon any one point. So that any written description of their course is rendered almost impossible, and the table alone must be consulted for the direction at any particular hour. From this revolving motion of the stream, it has been asserted that a vessel can never be carried far in any one direction by the tide. Such, however, is not the case; for, although it may be true that while at anchor in a particular spot the vessel's head will turn to every point of the compass, yet directly she is loose she will be carried away upon a rhomb depending upon the state of the tide at Dover.

*South of Scilly.*

*Bristol Channel.*

From the parallel of Scilly to the Bristol Channel the stream is more regular, and while the water is *falling* at Dover, will be found setting the *northward*: near the coast partaking of the direction of the shore, and turning sharply round Trevoze Head and Hartland Point into the Bris

nel; and while the water is *rising* at Dover, setting as sharply out the Bristol Channel and along the land towards Scilly.

By many observations, the Light vessel at the Seven Stones has been found to swing to the *northern* tide 7 minutes after high water at Dover; at Trevose Head the northern tide to make 12 minutes after Dover.

*Seven Stones.*

As a vessel advances up the Bristol Channel the stream turns progressively later. The tides of that estuary do not follow the same law as the tides of channels which are open at both extremities. The motions of the stream in the Bristol Channel will be given hereafter; I wish to draw the attention of the seamen to the particular

that while the stream from Scilly is setting to the *northward* the stream from the Irish Channel will be found setting to the *southward*, and these streams meet off the entrance of the Bristol Channel in about parallel of  $51^{\circ}00'$  where both turn into that channel. As a general

*Meeting of the Stream in  $51^{\circ} N.$*

in all the space eastward of a direct line joining Scilly and the Tuskar, the stream will be found running to the eastward towards the Irish Channel, while the water is *falling* at Dover and Liverpool, and *versâ*, setting to the *north-east* on the southern side of the Channel to the *south-east* on the northern side. Such is the general set of stream in this part of the sea, which I have given in general terms now that to the eastward of the line above mentioned a strong indraft runs the Bristol Channel will always be experienced while the water is *falling* at Liverpool, and *vice versâ*. To the westward of this line the stream appears to be slack; but we are in want of further observations in this part before any particulars can be entered into. Towards Cape Clear the northern stream from Scilly seems to join the southern and eastern streams from the Irish Channel, and both pass to the north-west of Cape Clear, and *vice versâ*.

*Streams between Scilly and Tuskar.*

*Off S. coast of Ireland.*

At the Smalls Lighthouse it is slack water 5 minutes before high water at the entrance of Liverpool; the stream sets past the rock S. by W.  $\frac{1}{2}$  W. direction while the water is *falling* at Liverpool, N. by E.  $\frac{1}{2}$  E. while it is *rising* there, veering to N. by E. during the two last hours of the tide. The strength of the tide is sensibly felt about and all the way from the Smalls to Pembroke, running up to  $3\frac{1}{2}$  or 4 knots at the height of the springs. To the southward of the Smalls the stream sweeps round in a broad curve to the S.E., and runs the Bristol Channel while the water is *falling* at Liverpool and *versâ*, as before stated. The entrance of Liverpool is properly the point to which the turn of the stream in these pages is referred, wherever a reference is made to that place it must be understood as being 18 minutes *earlier* than the time of high water at St. Georges; to which the tide tables are adapted.

*Off the Smalls.*

On the Irish side, at the Saltees Lightship, for instance, the water slack 22 minutes before it is high water at Liverpool entrance. The stream sets W.S.W. from a quarter of an hour before high water at Liverpool entrance to  $1\frac{1}{2}$  hours after, and then W.N.W. to low water.

*Off the Saltees.*

The flood or *rising tide* at Liverpool sets past the Saltees for the 3 hours E. by S., then E.S.E. for the 2 next hours, and S.E. by E. the last hour, when the tide slackens, as before, 22 minutes before high water at Liverpool entrance.

From the Saltees Lightvessel to the Tuskar the stream sets along the coast, but towards Carnsore Point begins to tend to the northward on the flood, and finally sets sharply round that point into the Irish Channel, and must be carefully watched by vessels in this situation.

*Off Carnsore Point.*

## SECTION I.

THE TIDAL STREAMS OF THE IRISH CHANNEL, WITH  
SHOWING THEIR COURSE AND RATE WHEN AT THEIR  
STRENGTH.

*Streams turn  
with the tides  
of Liverpool  
and Morecambe  
Bay.*

IN the Irish Channel, as before observed, experiments have shewn notwithstanding the variety of times of high water throughout the Channel, the turn of the stream over all that part which may be fairly navigable portion of the Channel is nearly simultaneous: northern and southern streams in both Channels commence at all parts (practically speaking) at nearly the same time; and time happens to correspond nearly with the time of high and low water at the shore at the entrance of Liverpool and of Morecambe Bay. Remarkable as being the point where the opposite tides converge, the extremities of Ireland terminate. So that it is necessary to know the times of high and low water at either of these points to determine the hour when the stream of either tide will commence in any part of the Channel. For this purpose the tide-table may be used, subtracting 18 minutes from the time given, in consequence of the high water at St. Georges Pier being earlier than the point which is considered as the head of the tide, as will be found fully explained at page 125.

*Streams enter  
N. and S. of  
Ireland.*

The tide from the Atlantic enters the Irish Channel by two points, of which Carnsore Point, the S.E. point of Ireland, and Lundy Head, the S.W. point of Wales, are the limits of the southern Channel; Rathlin and the Mull of Cantyre the boundaries of the northern Channel.

*Southern  
streams from  
Tuskar to the  
Isle of Man.*

The central portion of the stream of flood or ingoing stream runs nearly in a line from a point midway between the Tuskar and the Lundy Head to a position 16 miles due west of Holyhead; beyond which it expands eastward and westward; but its main body preserves its straight forward towards the Calf of Man, which it passes towards with increased velocity as far as Langness Point, and more moderate rate on towards Maughold Head. Here it is joined by the flood or southern stream from the North Channel coming from the Point of Ayr, and is first turned round to the eastward, then goes on with it at an easy rate direct for Morecambe Bay, changing its direction nearly eight points.

*Eastern Branch  
of S. stream sets  
into Cardigan  
Bay.*

The outer portions of the stream are necessarily deflected from the course of the great body of the water by the impediments on the Irish side of the Channel, and by the tortuous form of the coast of the Welsh. The eastern portion passing Linney Head, rushes rapidly between the Smalls, Grassholm, and Milford Haven to Bishopscourt, which it passes at a rate of between 4 and 5 knots; and round those rocks in an E.N.E. direction right over the Bass into Cardigan Bay; makes the circuit of that Bay, and sets out towards Bardsey, at the other extremity of it; then sweeps N. by W. past the island and through the Sound, it gradually changes the course of the shore, round Caernarvon Bay, filling the Mersey as far as Bangor; but the stream still continuing outside to South Stack, which it rounds, setting towards the Skerries at upwards of 4 knots; and, finally, turns sharp round those

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\* The entrances of Liverpool and of Morecambe Bay are, as before mentioned, earlier in their times of high water, than those given for Liverpool tables.

Liverpool and Morecambe Bay; completing in its way the high water in the Menai, and filling the Dee, the Mersey, and the Ribble.

The *western portion of the stream*, after passing the Saltees, runs nearly in the direction of the Tuskar, sets sharply round it, and then takes a N.E.  $\frac{1}{4}$  N. direction, setting fairly along the coast, but over the banks skirting the shore, so that vessels tacking near the inner edge of the sands on the flood, and on the outer edge on the ebb, have been carried upon them and lost, especially upon the Arklow and Codling Banks. Abreast of the Arklow is situated that remarkable spot in the Irish Channel, where the tide scarcely either rises or falls. The stream notwithstanding sweeps past it at the rate of 4 knots at the springs, and reaches the parallel of Wicklow Head. Here it encounters an extensive projection of the Codling bank; and while the outer portion takes the circuit of the bank, the inner stream sweeps over it, occasioning an over fall and strong rippling all round the edge, by which the bank may generally be discovered. Beyond this point the streams unite and flow on towards Howth and Lambay, growing gradually weaker as they proceed, until they ultimately expend themselves in a large space of still water situated between the Isle of Man and Carlingford. There we have not been able to detect any stream; for there another remarkable phenomenon occurs—the water rising and falling without having any perceptible stream. This space of still water is marked by a bottom of blue mud. Such is the course of the flowing water of the Southern Channel.

*Western Branch sets over the Irish banks.*

*Off Arklow, no rise or fall.*

*Codling Bank.*

*Stream ends off Carlingford. No stream there.*

In the North Channel the stream enters between the Mull of Cantyre and Rathlin Island simultaneously with that passing the Tuskar into the Southern Channel, but flows in the contrary direction. It runs at the rate of 3 knots at the springs, increasing to 5 knots near the Mull, and to 4 near Tor Point on the opposite side of the channel. The eastern branch of this stream turns round the Mull towards Ailsa and the Clyde, a portion passing round Sanda up Kilbrennen Sound and Loch Fyne. The main body sweeps to the S. by E., taking nearly the general direction of the Channel, but pressing more heavily on the Wigtonshire coast; off which it has scooped out a remarkable ditch, upwards of 30 miles long by about a mile only in breadth, in which the depth is from 70 to 100 fathoms greater than that of the general level of the bottom about it. Near the Mull of Galloway the stream increases in velocity to 5 knots; the eastern portion turns sharply round the promontory towards the Solway, and splits off St. Bees Head, one portion running up the Solway, and the other towards Morecambe Bay.

*Northern Stream from Rathlin to the Clyde.*

The *central portion* midway between the Mull of Galloway and the Copeland Island presses on towards the northern half of the Isle of Man; and while one portion of it flows towards the Point of Ayr, the other makes for Contrary Head, and is there turned back to the N.E. at a right angle nearly to its early course. Passing Jurby Point, it re-unites with the other portion of the stream and they jointly rush with a rapidity of from 4 to 5 knots round the Point of Ayr, and directly across all the banks lying off there, and catching up the stream from the south channel off Maughold Head, they hurry on together towards that great point of union, Morecambe Bay. This bay, the grand receptacle of the streams from both Channels, is notorious for its huge banks of sand, and also remarkable for a deep channel scoured out by the stream, and known as the Lune Deep, which is the great beacon to all vessels bound to that place.

*Central portion of this stream sets to Isle of Man and Morecambe Bay.*

*Lune Deep.*

We have now only to speak of the *western limit* of the stream, which was left off Tor Point running at a rate of 4 knots off the pitch of the point. Hence it strikes directly towards the Maidens, boiling over the Highlander and Russel Rocks, and other reefs in the vicinity of that

*Western branch of N. stream to Maidens and Belfast.*

dangerous group; and takes the direction of the coast again from Island to Black Head, at the entrance of the Lough of Belfast, fills.

*Belfast Lough.* The portion of the stream which sets into Belfast Lough at Grey Point; one portion flowing up towards Garmoyle, while the other bends back along the shore of Bangor, Groomsport, and Ormeau, and blends with the general stream which has come on from the Maidenhead at Blackhead in nearly a straight line, and passes with it through the sounds of the Copeland Islands. Hence it proceeds along the coast, and brushes the South Rock, and runs on towards St. John's Point, where the stream, like that coming from the southward, expands into the large space of still water, which remains almost undisturbed, although pressed upon by streams from various quarters.

*Ingoing Streams.* Such is a general description of the streams in the Irish Channel, which are produced by the flowing of the water, or which, for the purpose of distinction, we may designate the *inging streams*.

*Outgoing Streams.* The ebbing or *outing streams* do not materially differ from the reverse of those, except that in the southern channel they preponderate more over towards the Irish coast.

*Limits of the above Streams.* These observations do not, however, extend beyond the point where the Channels begin to open out, that is, beyond a line joining the Mull of Cantyre on the North, and the Saltees and Pembrokeshire on the South. Outside of these limits, the waters diverge right angles; that on the north joining the stream from Jura, and turning seaward towards Rathlin; that on the south, speaking now of the outgoing stream, passing past St. David's Head into the Bristol Channel on one side, and the other rounds the Tuskar, and passes on to Waterford.

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SHOWING THE MAGNETIC DIRECTION AND RATE (AT SPRINGS)  
OF THE TIDAL STREAMS IN THE IRISH CHANNEL.

the following Table, the direction of the stream as it runs at the e of the tide or at its greatest strength, is given at four places upon connecting well known headlands, viz., at 5 miles from the shore, each side of the channel, and at a third of the distance across the channel from each of those headlands. The names of the places will stand in the marginal columns; and in the adjacent column, a brief description of the course of the streams in the immediate vicinity of each headland. The western part of the stream will be found on the left-hand page, and the eastern half on the right-hand page. *Explanation.*

Use the table, take the line nearest to your position, and at the distance across the Channel which answers best to your distance from the headland, take out the direction of the stream from its column; or if the place of the ship falls between two divisions, take the mean of the directions given in the columns for the direction of the stream at that time. To know when the stream will turn, look in the Tide Tables for the time of high water at Liverpool, for the day, and about how many minutes after that time the stream will begin to *set out* in both the North and the South Channels, and will run in that direction until about 45 minutes before low water, when the general slack water begins. The slack water in the offing is usually spread over an interval of an hour—from the cessation of one stream to the beginning of the next.

In these tables { F stands for *flood* or *rising* tide at Liverpool.  
E stands for *ebb* or *falling* tide at Liverpool.

As a rough general rule, in the fair way of the Channel a vessel will be carried 9 miles by the stream in a whole tide at springs, and at neaps 5 miles; but near to the land on either side, or to the banks, the force of the stream greatly increases.

The rates given in the table which follows are at spring tides; and in order to adapt them to neaps, one third may be subtracted from them.

dangerous group; and takes the direction of the coast again from Muck Island to Black Head, at the entrance of the Lough of Belfast, which it fills.

*Belfast Lough.* The portion of the stream which sets into Belfast Lough splits off Grey Point; one portion flowing up towards Garmoyle, while the other bends back along the shore of Bangor, Groomsport, and Orlock, and blends with the general stream which has come on from the Maidens and Blackhead in nearly a straight line, and passes with it through the sounds of the Copeland Islands. Hence it proceeds along the coast, brushes the South Rock, and runs on towards St. Johns Point; off which the stream, like that coming from the southward, expends itself in the large space of still water, which remains almost undisturbed, although pressed upon by streams from various quarters.

*Ingoing Streams.* Such is a general description of the streams in the Irish Channel, which are produced by the flowing of the water, or which, for the purpose of distinction, we may designate the *inging streams*.

*Outgoing Streams.* The ebbing or *outgoing streams* do not materially differ from the reverse of those, except that in the southern channel they press rather more over towards the Irish coast.

*Limits of the above Streams.* These observations do not, however, extend beyond the points where the Channels begin to open out, that is, beyond a line joining Rathlin and the Mull of Cantyre on the North, and the Saltees and Pembroke on the South. Outside of these limits, the waters diverge right and left; that on the north joining the stream from Jura, and turning sharp round Rathlin; that on the south, speaking now of the outgoing stream, sweeps past St. Davids Head into the Bristol Channel on one side, and on the other rounds the Tuskar, and passes on to Waterford.

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of the Stream.				Remarks on the Tides near the Land.		Position.
1 over.		5 Miles.		From		
F	N.E. $\frac{1}{2}$	Rate. $2\frac{1}{2}$	N.E. $\frac{3}{4}$ E.	Rate. $3\frac{1}{2}$ to	St. Davids Head.	On a line joining St. Davids Head and the Tuskar.
E	S.W. $\frac{1}{2}$ W.	$2\frac{1}{2}$	S.W. $\frac{3}{4}$ W.	4		
and more in as you near the land. There is consequently an in-draught into this bay on both ebb and flood.						
F	N.E. by N.	$3\frac{1}{2}$	N.N.E. $\frac{1}{2}$ E.	3	Bardsey Island.	On a line joining Bardsey Island and the Arklow Light Ship.
E	S.W. $\frac{3}{4}$ S.	3	S.S.W. $\frac{1}{2}$ W.	$2\frac{1}{2}$		
Sound before it does in the offing; the flood setting strong into Caernarvon, and the ebb strong into Cardigan Bay, and <i>vice versa</i> .						
F	N.N.E. $\frac{3}{4}$ E.	$2\frac{1}{2}$	N. by E. $\frac{1}{2}$ E.	$3\frac{1}{2}$	Holyhead -	On a line joining Holyhead and Kish Light Ship.
E	S.W.	$2\frac{1}{2}$	S.W. $\frac{1}{2}$ S.	3		
more as you near the bight, setting into the bay on one side and out at the other end, near Holyhead Bay; the stream sets directly for the Skerries, sweeping into Holyhead Bay when inside a line, joining the North Stack and Skerries, and in the centre of the bay splits, one part setting sharply over the Platters and round Carmel Head, the other running for the Fenwick Rock and Penryn.						

first quarter ebb and flood, at first close in with the shore, and gradually increases in strength, extending to seaward in a direction between N. W. and W. S. W. from the lighthouse, according to time of tide ; about the last quarter tide it begins to subside. With strong winds blowing against the tide, the race is heavy, especially about half tide, and even dangerous at that time to small deep laden vessels, so that they should either go outside altogether or pass between it and the Stack (close to the latter). North and N. W. winds occasion the heaviest seas ; at a distance of 2 miles from the Stack the race is no longer felt, and by keeping the Skerries to the eastward of N. E. by E.  $\frac{1}{2}$  E. a vessel will pass outside of it. Off the North Stack also there is a race after half tide, and although not dangerous at any time, it had better be kept clear of in heavy weather, as the seas break short.

of the Stream.					Remarks on the Tides near the Land.		Position.
1/2 over.		5 Miles.		From			
F E	East W. by S.	Rate. 2 1 1/2	E. 1/2 N. W. 3/4 S.	Rate. 3 3	Skerry Lighthouse.	From the Skerries the stream sweeps over the Coal Rock, and runs on	On a line joining the Skerries and the Calf of Man.
thence to Lynus and Liverpool in nearly a direct line; but at 10 miles off shore it takes a more northerly direction, and strikes off for the Ribble and Morecambe Bay; near Lynus it curves to the southward, and runs for Priestholm and Great Orme Head; at half tide the stream slacks in Red Bay, and turns to the northward, and off Lynus meets the true tide, and forms a race.							
F E	E. 3/4 N. W. by S.	1 1/2 1 1/2	S.E. by E. N.N.W. 1/4 W.	2 1 1/2	Calf of Man	Near the Calf, and to the northward, the flood sets to the southward, and the	On a line joining the Calf of Man and Rockabill.
ebb to the northward; between the Calf and Rockabill the stream is very slack, being scarcely perceptible midway.							



## TIDAL STREAMS

TABLE showing the DIRECTION and RATE (at SPRINGS)

Position.	Remarks on the Tides near the Land.	Magnetic Direction				
		From	5 Miles.	$\frac{1}{2}$ over.		
On a line joining the Tuskar and St. Davids Head.	The stream curves with the land and slacks in shore $1\frac{1}{2}$ hours before the offing, and inside the Long Bank $2\frac{1}{2}$ hours before Liverpool, the stream setting over the bank N. by W. & S. W.	Tuskar -	N.E. $\frac{1}{2}$ E. S.W. $\frac{1}{2}$ W.	Rate. 3 3	N. E. by E. $\frac{1}{2}$ E. s. w. by w. $\frac{1}{2}$ w.	Rate. $2\frac{1}{2}$ $2\frac{1}{2}$ F E
On a line joining the Arklow Light Ship and Bardsey Island.	Near the Arklow bank the stream slacks half an hour before it does in the offing, and inside the Banks generally an hour and upwards before the offing.	Arklow Light Ship.	N.E. $\frac{1}{2}$ N. S.W. by S.	3·6 3·6	N.E. $\frac{1}{2}$ N. S.W. $\frac{1}{2}$ S.	$3\frac{1}{2}$ $3\frac{1}{2}$ F E
On a line joining the Kish Light Ship and Holyhead.	The stream slacks at the Kish upwards of half an hour before the offing, and then bends inwards, towards the bay, setting over the Kish bank; further in shore it turns $1\frac{1}{2}$ hours before the offing, and 2 hours close in shore.	Kish Light Ship.	N.N.E. S.S.W. $\frac{1}{2}$ W.	2·0 2	N.N.E. S.S.W. $\frac{1}{2}$ W.	$2\frac{1}{2}$ $2\frac{1}{2}$ F E

In approaching Holyhead be guarded against the tides which run very strong near the Headlands.

At 7 miles off the South Stack the stream runs  $2\frac{1}{2}$  knots at springs.

At 5 miles ditto ditto 3 to  $3\frac{1}{2}$  knots at springs.

At 2 miles ditto ditto 5 knots at springs.

The neaps run about two thirds of these rates. In the channel the direction of the flood is about N.E. by N., and near the Stack N.E. or N.E.  $\frac{1}{2}$  E. towards the Skerries. Off the Skerries, that is, outside them, the flood turns more easterly, or runs E.N.E., and to the northward of the Skerries due east, or E.  $\frac{1}{2}$  N.

Off the South Stack there is a race occasioned by the meeting of the tides, but increased by some uneven rocky ground off the Stack. It begins about the

Position.	Remarks on the Tides near the Land.	Magnetic Direction				
		From	5 Miles.	$\frac{1}{2}$ over.		
On a line joining the Calf of Man and the Skerries.	The flood stream meets the northern stream close to the Calf, and both run along the land to the eastward.	Calf of Man.	E. $\frac{1}{2}$ S. W.N.W. $\frac{1}{2}$ W.	Rate. $2\frac{1}{2}$ $2\frac{1}{2}$	E. $\frac{1}{2}$ N. W. $\frac{1}{2}$ S.	Rate. $1\frac{1}{2}$ $1\frac{1}{2}$ F E
On a line joining Rockabill and the Calf of Man.	From Rockabill to the northward the stream sets fair, taking nearly the direction of the coast, and passes on to St. Johns Point, when it encounters the stream from the North Channel; near here the stream turns to the westward, and bends in taking the curve of Dundrum Bay, which must be guarded against.	Rockabill -	N. by E. S. by W.	1·0 $1\frac{1}{4}$	N.E. $\frac{1}{2}$ E. S.S.W.	$\frac{1}{2}$ $\frac{1}{2}$ F E

## TIDAL STREAMS in the IRISH CHANNEL.

Name.				Remarks on the Tides near the Land.	Position.
$\frac{1}{2}$ over.	5 Miles.		From		
$\frac{1}{2}$ E.	Rate. $2\frac{1}{2}$	N.E. $\frac{3}{4}$ E.	Rate. $3\frac{1}{2}$ to 4	St. Davids Head.	On a line joining St. Davids Head and the Tuskar.
$\frac{1}{2}$ W.	$2\frac{1}{2}$	S.W. $\frac{3}{4}$ W.	4		
and more in as you near the land. There is consequently an in-draught into this bay on both ebb and flood.					
by N.	$3\frac{1}{2}$	N.N.E. $\frac{1}{2}$ E.	3	Bardsey Island.	On a line joining Bardsey Island and the Arklow Light Ship.
$\frac{1}{2}$ S.	3	S.S.W. $\frac{1}{4}$ W.	$2\frac{1}{2}$		
Sound before it does in the offing; the flood setting strong into Caernarvon, and the ebb strong into Cardigan Bay, and <i>vice versa</i> .					
E. $\frac{3}{4}$ E.	$2\frac{1}{2}$	N. by E. $\frac{1}{2}$ E.	$3\frac{1}{2}$	Holyhead -	On a line joining Holyhead and Kish Light Ship.
$\frac{1}{2}$ W.	$2\frac{1}{2}$	S.W. $\frac{1}{4}$ S.	3		
more as you near the bight, setting into the bay on one side and out at the other end, near Holyhead Bay; the stream sets directly for the Skerries, sweeping into Holyhead Bay when inside a line, joining the North Stack and Skerries, and in the centre of the bay splits, one part setting sharply over the Platters and round Carmel Head, the other running for the Fenwick Rock and Penryn.					

quarter ebb and flood, at first close in with the shore, and gradually increases length, extending to seaward in a direction between N. W. and W. S. W. from ighthouse, according to time of tide; about the last quarter tide it begins to ide. With strong winds blowing against the tide, the race is heavy, especially t half tide, and even dangerous at that time to small deep laden vessels, so they should either go outside altogether or pass between it and the Stack e to the latter). North and N.W. winds occasion the heaviest seas; at a nce of 2 miles from the Stack the race is no longer felt, and by keeping the ries to the eastward of N.E. by E.  $\frac{1}{2}$  E. a vessel will pass outside of it. Off North Stack also there is a race after half tide, and although not dangerous at time, it had better be kept clear of in heavy weather, as the seas break

Name.				Remarks on the Tides near the Land.	Position.
$\frac{1}{2}$ over.	5 Miles.		From		
East by S.	Rate. 2 $1\frac{1}{2}$	E. $\frac{1}{2}$ N. W. $\frac{3}{4}$ S.	Rate. 3 3	Skerry Lighthouse.	From the Skerries the stream sweeps over the Coal Rock, and runs on the shore it takes a more northerly direction, and strikes off for the Ribble and Morecambe Bay; near Lynus it curves to the southward, and runs for Priestholm and Great Orme Head; at half tide the stream slacks in Red Bay, and turns to the northward, and off Lynus meets the true tide, and forms a race.
$\frac{3}{4}$ N. by S.	$1\frac{1}{2}$ $1\frac{1}{2}$	S.E. by E. N.N.W. $\frac{1}{4}$ W.	2 $1\frac{1}{2}$	Calf of Man	On a line join- ing the Sker- ries and the Calf of Man.
ebb to the northward; between the Calf and Rockabill the stream is very slack, being scarcely perceptible midway.					On a line join- ing the Calf of Man and Rockabill.

TABLE showing the DIRECTION and RATE (at SPRINGS)

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.	$\frac{1}{2}$ over.			
On a line joining Calf of Man and Walney Island.	Near the Calf, and eastward to Langness Point, the stream runs strong, and near the land bends to the northward, and passes Douglass Head on to Maughold Head, where it is turned to the East and S.E. by the northern stream.	Calf of Man	E. $\frac{1}{4}$ N. W. $\frac{1}{2}$ N.	Rate. $3\frac{1}{2}$ $3\frac{1}{4}$	East West	Rate. 2 2	F E
On a line joining St. Johns Point and Peel (Isle of Man).	The streams from the north and south channels meet off St. Johns Point. Near the land the stream runs 2 knots at springs, but at a distance there is scarcely any tide. Off the mouth of Lough Strangford, on a south bearing, the outset will be felt at a distance of $3\frac{1}{2}$ miles, sweeping in a curve to the N.E. with the ebb, and to the S.W. with the first of the flood, forming a race: the outset continues to run 2 hours after low water.	St. Johns Point.	s.w. by w. $\frac{1}{2}$ w. N.E. by E.	$1\frac{1}{2}$ $1\frac{1}{2}$	S.W. $\frac{1}{4}$ W. N.E. $\frac{1}{4}$ N.	$0\frac{1}{2}$ Drain	F E
On a line joining Peel and Mull of Galloway.	- - -	Peel	E. $\frac{1}{4}$ N. W. $\frac{1}{2}$ N.	1 $1\frac{1}{4}$	E. by S. W.N.W. $\frac{3}{4}$ W.	$1\frac{1}{2}$ $1\frac{1}{2}$	F E

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.	$\frac{1}{2}$ over.			
On a line joining the Point of Ayr and Burrow Head.	Near the Point of Ayr, in a N.N.W. direction, there is usually a race, especially on the ebb: it takes place upon a bank, which, although shallower than the parts about it, is not dangerous.	Point of Ayr	S.E. by E. $\frac{3}{4}$ E. W. by N.	Rate. $3\frac{1}{4}$ 3	E. $\frac{3}{4}$ S. W. by N.	Rate. $2\frac{1}{2}$ $3\frac{1}{4}$	F E
On a line joining the Point of Ayr and St. Bees Head.	- - -	Point of Ayr	S. $\frac{3}{4}$ E. N.N.W.	$2\frac{1}{2}$ $1\frac{3}{4}$	S. $\frac{3}{4}$ E. N.W. by N.	$2\frac{1}{2}$ 2	F E

On the line joining Point of Ayr and St. Bees Head are situated the White-stone and King William Banks, which are very dangerous. The tide sets immediately over them, S. by E.  $\frac{1}{2}$  E., at a rapid rate, and ought to be carefully guarded against.

The stream sets round the Point of Ayr into Ramsey Bay about the time of low water at Liverpool, and sweeps over the Bahama Bank, and from thence

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.	$\frac{1}{2}$ over.			
On a line joining Copeland Island and Mull of Galloway.	- - -	Copeland Island.	S. $\frac{1}{4}$ E. N. $\frac{1}{2}$ W.	Rate. 2 2	S. by E. $\frac{1}{4}$ E. N. by W. $\frac{1}{4}$ W.	Rate. 2 $2\frac{1}{2}$	F E

## Magnetic Direction and Rate of the

After High Water at Liverpool.

1 Hour.		2 Hours.		3 Hours.		4 Hours.		5 Hours.		6 Hours.	
Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
N. $\frac{1}{2}$ E.		North		N. by W. $\frac{1}{4}$ W.		N.N.W. $\frac{3}{4}$ W.		N.W. $\frac{1}{2}$ N.		S.W. $\frac{1}{4}$ W.	

TIDAL STREAMS in the IRISH CHANNEL—*continued.*

3rd quarter of the flood having turned to the northward, meets the tide in the Sound off the Deputy Reef, and they jointly strike off for the south of the Copeland Islands and pass over the Bushes, and thence through the Sound between the Islands.

An eddy under Mew Island at this time rushes with great speed to the north, until it meets the true tide, and with it forms a race which sailing-vessels should avoid; upon the ebb a similar race occurs, but to the N.E. of Mew Island.

The last of the flood goes to the northward through the Sound, and splits off at the end of the Copeland, and one part runs for Mew Island, throwing off an eddy between the islands.

About the Copeland Islands the eddies are very strong, and at night a vessel should be sure that she is outside the drift of the point of Mew Island.

Tide.		From	Remarks on the Tides near the Land.	Position.
5 Miles.	Rate.			
S.E. by W.	$2 \frac{1}{4}$	Sanda Island	The tide runs fast past Sanda Island, and is variable in its direction. Off the western end of the island it splits; the outer part passing on for the Clyde, and the other going inside the island, and up Kilbrennen Sound, as mentioned below.	On a line joining Sanda Island and Corsewall Point.
$\frac{1}{2}$ E. $\frac{1}{2}$ W.	$1 \frac{1}{2}$	Corsewall Point.	- - - - -	On a line joining Corsewall Point and Muck Island.

After passing Whitehead, the tide slacks considerably as you enter the Lough. In the flood there is a strong eddy under Muck Island, which will be found dangerous to steamers and even sailing-vessels beating along this coast; with a strong wind they will do well to keep close in with the shore hereabout, as the first of the flood strikes off from Muck Island in a S. E. direction, till it meets the ebb which passes the eastern side of the Maidens, when it takes a channel on; the meeting of these two tides appear to have occasioned a deep ditch, which will be found from 90 to 100 fathoms water.

Remarks on the Tides near the Land.	Position.
In the Mull of Cantyre the stream runs 5 knots, and occasions a heavy rough sea in bad weather; with either tide, quite close in, there is an eddy. At the Mull of Cantyre the flood takes a direction nearly for Sanda Island, and divides off its western end: one part passing inside the island and up Kilbrennen Sound, the other running on for the Clyde.	On a line joining Mull of Cantyre and Tor Point.

## THE TIDES NEAR RATHLIN ISLAND.

BY RICHARD HOSKYN, STAFF COMMANDER R.N.,

In charge of the Survey on the North-east Coast of Ireland.

- Rate of tide.* ABOUT Rathlin Island the tides are very rapid, in the Sound they run from 4 knots at neaps to  $6\frac{1}{4}$  knots at springs, occasioning strong eddies along the shores, with heavy overfalls off all the headlands.
- Eddy from Tor Point through the Sound.* On each side of Tor Point there is an eddy which at half tide gradually extends from the shore, at the last quarter of the Channel flood this eddy goes to the westward through Rathlin Sound, causing the ebb stream to make there  $1\frac{1}{2}$  hours sooner than it does to the northward of the island; by taking advantage of these eddies a ship from the southward may carry 9 hours tide with her through Rathlin Sound.
- Eddy on south shore.* To the westward of Fair Head all along the south shore of the Sound as far as Sheep Island there is an eddy with both streams, commencing at half tide. Carrickvaan Rock lies at the junction of the eddy and true streams.
- Ebb stream.* During the first hour and half, the ebb stream sets round the Rue Point into Church Bay, but after high water at Liverpool, when the general stream north of the island has made to the westward, and it has attained a rate of  $6\frac{1}{4}$  knots through the Sound, an eddy begins in Church Bay, setting from the Bull Point towards the Rue, and meeting the true tide about a mile to the westward of the latter, where the bottom is very irregular, a great overfall is occasioned, called Slough-na-more, which may be attended with danger to small vessels.
- Eddy in Church Bay.* The eddy from Church Bay has now forced the main stream into a more southerly course, with contracted limits it sets from Rue Point towards the Carrickvaan Rock, whence it shoots off in a N.W. direction towards the Bull Point at the west end of Rathlin, meeting there the stream from the north side of the island setting to the S.W.
- Dangerous overfall.* The flood or eastern stream does not begin in the middle of the Sound until it is low water at Liverpool, although, as before observed, the eddy along the south shore commences at half tide. There is no slack water preceding the flood stream; in the eastern part of the Sound at low water it sets south  $2\frac{1}{2}$  knots, in the western part at the same moment it sets north  $1\frac{3}{4}$  knots, eddying round at each station in opposite directions. The stream soon becomes general, setting fair through the Sound, and rushing out of Church Bay past the Rue with great force, including the eddy before alluded to, it sets for 10 hours across Church Bay to the eastward. During the flood stream there is an eddy to the eastward of the island, extending  $2\frac{1}{2}$  miles from the shore, setting back on the island; at the junction of the eddy and true streams there are great overfalls off Altacarry Head, and again off the Rue as mentioned above.
- Direction of ebb.* With a commanding breeze there is no danger in the navigation of Rathlin Sound, but in light winds great vigilance is necessary to avoid being caught in the eddies or overfalls.
- Flood stream.* Off Bengore Head, at a mile distant, the stream turns about 15 minutes after high and low water at Liverpool; springs run 3 knots, the ebb setting W.N.W. and the flood E. b. S. In the bays on each side of the heads an eddy begins when the stream in the offing has run half its course.
- Eddy to eastward of Island.*
- Navigation of Sound.*
- Streams off Bengore Head.*

## THE TIDES NEAR RATHLIN ISLAND.

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- Eddy from Tor Point through the Sound.* On each side of Tor Point there is an eddy which at half tide gradually extends from the shore, at the last quarter of the Channel flood this eddy goes to the westward through Rathlin Sound, causing the ebb stream to make there  $1\frac{1}{2}$  hours sooner than it does to the northward of the island; by taking advantage of these eddies a ship from the southward may carry 9 hours tide with her through Rathlin Sound.
- Eddy on south shore.* To the westward of Fair Head all along the south shore of the Sound as far as Sheep Island there is an eddy with both streams, commencing at half tide. Carrickvaan Rock lies at the junction of the eddy and true streams.
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- Dangerous overfall.* The flood or eastern stream does not begin in the middle of the Sound until it is low water at Liverpool, although, as before observed, the eddy along the south shore commences at half tide. There is no slack water preceding the flood stream; in the eastern part of the Sound at low water it sets south  $2\frac{1}{2}$  knots, in the western part at the same moment it sets north  $1\frac{3}{4}$  knots, eddying round at each station in opposite directions. The stream soon becomes general, setting fair through the Sound, and rushing out of Church Bay past the Rue with great force, including the eddy before alluded to, it sets for 10 hours across Church Bay to the eastward. During the flood stream there is an eddy to the eastward of the island, extending  $2\frac{1}{2}$  miles from the shore, setting back on the island; at the junction of the eddy and true streams there are great overfalls off Altacarry Head, and again off the Rue as mentioned above.
- Direction of ebb.* With a commanding breeze there is no danger in the navigation of Rathlin Sound, but in light winds great vigilance is necessary to avoid being caught in the eddies or overfalls.
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- Eddy to eastward of Island.*
- Navigation of Sound.*
- Streams off Bengore Head.*

erry Islets the *ebb stream* sets fair through the anchorage to the westward, attaining a velocity of 3 to  $3\frac{1}{2}$  knots in between Ramore Head and the Carr Rocks, and creating lesome sea.

*Streams near the Skerry Islet.*

stream sets from Ramore Head towards the Carr Rocks; und is entered it sets fair through.

Sound it sets down on the Little Skerry, while the ebb e northward through the Sound.

chorage under the Great Skerry there is little tide felt, it is slack water at half tide, on the ebb with the last e on the north side of the rocks the stream runs with a knots.

ceed to the westward towards Lough Foyle the tide loses trength, north of the mouth of the Bann, 3 miles off shore ate at springs is  $1\frac{3}{4}$  knots.

*To the westward.*

an eddy tide all the way along the shore from the Skerry mouth of the Bann, commencing at half tide, the line of vith the main stream being marked by a strong rippling.

*Eddy.*

s north of Port Stewart the channel stream turns to the our and 40 minutes after low water at Liverpool, or at on the adjoining shore, and to the westward 31 minutes ater at Liverpool, or three quarters of an hour before low

*Off Port Stewart.*

adjoining shore, so that, on this part of the coast, the tide reference to its head at Liverpool) being nearly reversed, what to a person watching the rise and fall of the tide appears at first sight so anomalous) the whole of the ebb ng from the ocean, while the flood comes from the opposite

*High and low water not occasioned by tidal stream,*

the tidal stream to the head of the tide at Liverpool, and times of high water to the undulation of the tide wave, t anomaly disappears.

*but by tidal wave.*

oast to the westward of Fair Head is subject to a ground e weather the commencement of the east-going stream is ent by the sudden appearance of the swell, resuming again e state of quiet when the west-going stream makes.

*Ground swell.*

## SECTION II.

THE TIDAL STREAMS OF THE ENGLISH CHANNEL, WITH  
SHOWING THEIR COURSE AND RATE AT EVERY HOUR OF THE  
AT DOVER.

*Streams turn  
with the tides of  
Dover.*

IN the English Channel, as before stated (page 120), the time of water *at Dover* is to be taken as the standard, so that whenever the time of the turn or the direction of the stream is required known, the time of the ship is to be compared with the time of water for the day at the standard place, and the interval sought table which accompanies these remarks, and in the column answer the ship's position will be found the information required.\*

*Tidal Compart-  
ments.*

In these tables it has been necessary to class the information heads answering to the various compartments of the Channels; courses of the stream in the mixed tides are so changeable that different stream will be found running at a place but little removed another in the same portion of the Channel. The seaman must fore look in which compartment according to his latitude and longitude his ship is sailing, and in which quarter of that compartment, whether N.E., N.W., S.E., or S.W., and then enter the table for the direction of the stream.

*1st Compart-  
ment.*

The 1st compartment, as previously stated (page 120), comprises approach to the English Channel *westward of a line joining the Start and Scilly.*

*2d Compart-  
ment.*

The 2d compartment comprises a space eastward of the line mentioned from Ushant to Scilly, and as far as a line joining the *Start and the Casquets.* In this part of the Channel there is a joint tide, partaking of the joint directions of the Channel and streams.

*3d Compart-  
ment.*

The 3d compartment is bounded on the west by the line joining the *Casquets* and the *Start*, and on the east by a line from *Beauby Head to Dieppe*, having the Baie de la Seine on the south. As soon as a vessel passes to the eastward of the *Start* and *Casquets* she gets the true Channel stream which sets straight up and down Channel the fairway, and will always carry a vessel *towards Beauby Head* the water is *rising at Dover*, and *from it* while it is *falling there.*

*4th Compart-  
ment.*

The 4th compartment comprises the Gulf of St. Malo, and which from its magnitude and large tides exercises a powerful influence over the navigation of that part of the Channel in its immediate vicinity and the seaman must be especially on his guard when drawing near this locality. With the *falling water* at Dover the stream sets *into this Gulf* on both sides,† which the prevalence of westerly is said to increase, and with the *rising water* at Dover it sets *across out of the Gulf*, the north-eastern part of the stream sweeping the *Casquets* towards Alderney, and through the *Russell and the Channels* about Guernsey towards the race of Alderney.

*5th Compart-  
ment.*

The 5th compartment contains the great bight on the south of the Channel eastward of Cape Barfleur, known as the Baie de la Seine. With the *rising water* at Dover the stream sets sharply round Cape Barfleur *into the bay*, curving more and more as the depth of the bay is gained until it finally takes the sweep of the shore. With the *falling tide* the western half of the bay is partly in eddy, and the tide in all that part nearly an hour before high water at Dover, while the eastern half of the bay it runs about half an hour longer than at

\* The time at ship is to be corrected for the longitude of Dover.

† A return of the vessels wrecked on the Channel Islands shows that the part of them came ashore about the end of the falling water at Dover.



that here a ship beating up Channel towards the end of a rising tide Dover may prolong the tide in her favour by standing close over the French Coast eastward of Havre. On approaching Boulogne, however, at the beginning of a *rising tide*, great attention should be paid to the direction in the tables, as the streams hereabout meet and are turned down upon the French Coast, so that a ship, which on the English side would at this time have a stream setting straight up Channel, here encounters one upon her beam, sweeping her down towards the Somme, and hence probably the cause of some of the many disastrous losses which have occurred in this part of the Channel.

6th Compartment.

The 6th compartment is between Beachy Head and the North Foreland, and the Somme and Dunkerque. In this space the streams from the Channel and North Sea *meet* while the water is *rising* at Dover, and *separate* while it is *falling* there. The point of union and separation is not, however, stationary, but moves from west to east both on the rising and falling water. For instance, an hour after high water at Dover the separation begins off Beachy Head; in two hours it has reached Hastings, in three hours Rye, and so it creeps on until at low water it has gained the line extending from the North Foreland to Dunkerque. At this time the offing streams on both sides have done, and it is slack water all over the North Sea and English Channel as far as the true tide extends; but the stream does not at this time cease in the intermediate tide. When the water at Dover begins to rise, the stream on either side sets *towards Dover*, and that from the North Sea consequently *goes with the intermediate* tide, which had not yet ceased running to the westward, while the other, the Channel stream, *opposes* it, and this opposition continues throughout the rising tide at Dover; the point of meeting gradually shifting its position eastward as the tide advances on the shore.\* About the time when the water at Dover has done rising, the line of meeting has reached the North Foreland, and the streams are now slack over the Channels east and west, leaving the intermediate stream running alone before to the eastward. The next hour finds the offing streams made *own* east and west, so that now the intermediate stream falls in with the North Sea stream and goes with it, whilst on the west it separates from the Channel stream, splitting at the same point, Beachy Head, as first.

Such is the general description of the course and routine of the tidal streams of the English Channel and intermediate tide, a careful perusal which will enable the reader the more readily to understand the actions and tables annexed.

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The place of *meeting* begins off Beachy Head at *five hours before* high water on the spot as that of the *separation* at *one hour after* high water; the place of *four hours before* high water is nearly the same as that of the separation at *two hours after*; and *1* nearly with the subsequent hours.

## TIDAL STREAMS

TABLE showing the MAGNETIC DIRECTION of the STREAM in the ENGLISH CHANNEL at every HOUR of the TIDE at DOVER.

## COMPARTMENT I.

Westward of a Line joining Ushant and the Land's End.

Hours.	North Side of Latitude 49°00' N.						REMARKS.	South Side of 49°00' N.	
	West part.	Rate.	Near Scilly.	Rate.	Seven Stones.	Rate.		West part.	Rate.
Before High Water, Dover.	1	W.N.W. ¼ W	N.N.W. ¼ W.	N. ¼ W.	N. ¼ W.	N. ¼ W.		W. ¼ S.	
	2	N. ¼ W.	N. ¼ W.	N.N.E.	N.N.E.	N.N.E.		N. by W. ¼ W.	
	3	N.E. ¼ E.	N.N.E.	N.E. ¼ N.	N.E. ¼ N.	N.E. ¼ N.		E.N.E. ¼ E.	
	4	E.N.E. ¼ E.	N.N.E.	N.E. ¼ E.	N.E. ¼ E.	N.E. ¼ E.		E.N.E. ¼ E.	
	5	E.N.E. ¼ E.	N.E. by E.	N.E. ¼ E.	N.E. ¼ E.	N.E. ¼ E.		N.E. by E. ¼ E.	
	6	E. ¼ S.	E. ¼ S.	E.N.E. ¼ E.	E.N.E. ¼ E.	E.N.E. ¼ E.		Turning.	
After High Water, Dover.	1	S.E. by E. ¼ E.	-	S. ¼ W.	S.S.W. ¼ W.	S. ¼ W.		S. by E. ¼ E.	
	2	S. ¼ E.	South.	S.S.W. ¼ W.	S.S.W. ¼ W.	S.S.W. ¼ W.		Draining.	
	3	S.S.W. ¼ W.	S.W.	S.S.W. ¼ W.	S.S.W. ¼ W.	S.S.W. ¼ W.		S.W. ¼ W.	
	4	S.W. by W.	S.W. by W.	S.W. ¼ S.	S.W. ¼ S.	S.W. ¼ S.		S.W. ¼ S.	
	5	W.S.W. ¼ W.	S.W. by W.	W.S.W.	W.S.W.	W.S.W.		S.W. by W. ¼ W.	
	6	W.S.W. ¼ W.	W.S.W.	W.S.W.	W.S.W.	W.S.W.		W.S.W.	

## COMPARTMENT II.

Between { A Line joining the Land's End and Ushant,  
" " the Casquets and Start, and  
" " the Casquets and Sept Iles.

Hours.	North Side of the Channel.						REMARKS.	South Side of the Channel.					
	West part.	Rate.	Centre.	Rate.	East part.	Rate.		West part.	Rate.	Centre.	Rate.	East part.	Rate.
Before High Water, Dover.	1	W.N.W. ¼ W.	W. ¼ N.	W. ¼ N.	W. ¼ N.	W. ¼ N.		W. ¼ S.	W. ¼ N.	W. ¼ N.	W. ¼ S.	W. ¼ S.	W. ¼ S.
	2	Turning.	N.W. by W. ¼ W.	W. ¼ N.	W. ¼ N.	W. ¼ N.		Slack.	West.	West.	W. by S.	W. by S.	W. by S.
	3	N. ¼ E.	W. ¼ N.	West.	W. ¼ N.	W. ¼ N.		East.	Slack.	Slack.	W.S.W.	W.S.W.	W.S.W.
	4	E. ¼ S.	Slack.	S. ¼ W.	S. ¼ W.	S. ¼ W.		E. by N.	E.S.E. ¼ E.	E.S.E. ¼ E.	S.E. by S.	S.E. by S.	S.E. by S.
	5	East.	E. ¼ S.	S.E. ¼ S.	S.E. ¼ S.	S.E. ¼ S.		E.N.E. ¼ E.	E. ¼ S.	E. ¼ S.	S.E. by E. ¼ E.	S.E. by E. ¼ E.	S.E. by E. ¼ E.
	6	E. by S.	E. ¼ S.	E.S.E. ¼ E.	E.S.E. ¼ E.	E.S.E. ¼ E.		E. ¼ N.	S.E. by E. ¼ E.	S.E. by E. ¼ E.	S.E. by E. ¼ E.	S.E. by E. ¼ E.	S.E. by E. ¼ E.
After High Water, Dover.	1	E.S.E. ¼ E.	E. by S.	E. by S.	E. by S.	E. by S.		E. ¼ S.	E. by S.	E. by S.	E.S.E. ¼ E.	E.S.E. ¼ E.	E.S.E. ¼ E.
	2	Slack.	E.S.E. ¼ E.	E. ¼ S.	E. ¼ S.	E. ¼ S.		N.E. by E. ¼ E.	Slack.	Slack.	E. ¼ N.	E. ¼ N.	E. ¼ N.
	3	Turning.	Slack.	E. ¼ S.	E. ¼ S.	E. ¼ S.		Slack.	W.N.W.	W.N.W.	North	North	North
	4	W. by N.	W. ¼ N.	Turning.	W. ¼ N.	W. ¼ N.		S.W. by W. ¼ W.	Slack.	Slack.	W.N.W. ¼ W.	W.N.W. ¼ W.	W.N.W. ¼ W.
	5	W. ¼ S.	W. ¼ N.	W.S.W. ¼ W.	W.S.W. ¼ W.	W.S.W. ¼ W.		S.W. by W.	W. by N.	W. by N.	N.W. ¼ W.	N.W. ¼ W.	N.W. ¼ W.
	6	W. ¼ S.	W. ¼ N.	W.S.W. ¼ W.	W.S.W. ¼ W.	W.S.W. ¼ W.		W. by N.	W. by N.	W. by N.	N.W. ¼ W.	N.W. ¼ W.	N.W. ¼ W.

## COMPARTMENT III.

Between { A Line joining Start and Casquets, and  
" " Point Ailly and Beachy Head.

Hours.	North Side of the Channel.						REMARKS.	South Side of the Channel.					
	West part.	Rate.	Centre.	Rate.	East part.	Rate.		West part.	Rate.	Centre.	Rate.	East part.	Rate.
Before High Water, Dover.	1	W. ¼ N.	W.N.W. ¼ W.	W.N.W. ¼ W.	Turning.	W.N.W. ¼ W.		W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.
	2	W.N.W. ¼ W.	N.W. by W. ¼ W.	N.W. by W. ¼ W.	W.N.W. ¼ W.	W.N.W. ¼ W.		W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.
	3	W. ¼ N.	N.W. by W. ¼ W.	N.W. by W. ¼ W.	W.N.W. ¼ W.	W.N.W. ¼ W.		W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.	W. ¼ S.
	4	W. ¼ N.	W.N.W.	W.N.W.	W. ¼ N.	W. ¼ N.		W.S.W.	W.S.W.	W.S.W.	W.S.W.	W.S.W.	W.S.W.
	5	W. ¼ S.	W.N.W.	W.N.W.	W. by N.	W. by N.		W.S.W. ¼ W.	W.S.W. ¼ W.	W.S.W. ¼ W.	W.S.W. ¼ W.	W.S.W. ¼ W.	W.S.W. ¼ W.
	6	N.N.E. ¼ E.	W.N.W. ¼ W.	W.N.W. ¼ W.	W. by N.	W. by N.		Slack.	Slack.	Slack.	Slack.	Slack.	Slack.
After High Water, Dover.	1	E. ¼ S.	E.S.E.	E.S.E.	E.S.E. ¼ E.	E.S.E. ¼ E.		E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.
	2	E.S.E. ¼ E.	S.E. by E. ¼ E.	S.E. by E. ¼ E.	E.S.E. ¼ E.	E.S.E. ¼ E.		E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.
	3	E.S.E. ¼ E.	S.E. by E. ¼ E.	S.E. by E. ¼ E.	E.S.E. ¼ E.	E.S.E. ¼ E.		E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.
	4	E.S.E. ¼ E.	S.E. by E. ¼ E.	S.E. by E. ¼ E.	E.S.E. ¼ E.	E.S.E. ¼ E.		E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.	E. ¼ S.
	5	E.S.E. ¼ E.	E.S.E.	E.S.E.	E. ¼ S.	E. ¼ S.		E.N.E.	E.N.E.	E.N.E.	E.N.E.	E.N.E.	E.N.E.
	6	E.S.E. ¼ E.	E.S.E.	E.S.E.	E. ¼ S.	E. ¼ S.		E.N.E.	E.N.E.	E.N.E.	E.N.E.	E.N.E.	E.N.E.

**f Gulf of St. Malo on a line joining Brehat Island and S.W. line of Guernsey Island.**

s from Island.		12 miles from Guernsey Island.		Near S.W. Point, Guernsey Island.		4 miles W. by S. from Casquets.		4 miles W.N.W. of Cape La Hague.	
REMARKS.									
1.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
W.	Greatest rate, springs, uncertain knots.	W. $\frac{3}{4}$ N.	Greatest rate, springs, uncertain knots.	W. $\frac{3}{4}$ N.	Greatest rate, springs, uncertain knots.	W. $\frac{3}{4}$ S.	knobs.	S.W. by W. $\frac{3}{4}$ W.	Greatest rate, springs, 5 to 7 knots.
7.		S. $\frac{1}{4}$ W.		S.S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ W.		S.W. by W. $\frac{3}{4}$ W.	
7.		S. $\frac{3}{4}$ W.		S.S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ W.		S.W. by W. $\frac{3}{4}$ W.	
8.		S.S.E. $\frac{3}{4}$ E.		S.E. by E. $\frac{1}{2}$ E.		S. by E. $\frac{1}{4}$ E.		S.W. $\frac{1}{4}$ S.	
8.		S.E. $\frac{3}{4}$ E.		S.E. by E. $\frac{1}{2}$ E.		S.E. $\frac{1}{2}$ E.		S.W. $\frac{1}{4}$ S.	
8.		S.E. $\frac{1}{4}$ S.		S.E. by E. $\frac{1}{2}$ E.		S.E. $\frac{1}{2}$ E.		N.E. by E. $\frac{3}{4}$ E.	
E.		S.E. by E.		{ S.E. by E. $\frac{1}{2}$ E. E. $\frac{1}{4}$ N. S.E. by E. $\frac{1}{2}$ E. E. $\frac{1}{2}$ N. }		E. $\frac{3}{4}$ N.		N.E. by E. $\frac{3}{4}$ E.	
		..		..		N.E. $\frac{1}{2}$ N.		N.E. by E. $\frac{3}{4}$ E.	
W.		N.W. $\frac{1}{2}$ N.		..		N.E. $\frac{1}{2}$ N.		N.E. $\frac{1}{4}$ N.	
W.		N.W. $\frac{1}{4}$ W.		N. by W. $\frac{3}{4}$ W.		N.E. by E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.	
W.		W.N.W. $\frac{1}{4}$ W.		N. by W. $\frac{3}{4}$ W.		N.W. $\frac{1}{2}$ W.		N.E. $\frac{1}{4}$ N.	

the Baie de la Seine, south of a line joining Cape Barfleur and Cape Antifer.

West Part.	Rate.	Centre.	Rate.	East Part.	Rate.	REMARKS.
N.N.W. $\frac{1}{2}$ W.	Greatest rate, } knota. springs, - } flood 4'20 ebb 3'70	N.W. by W. $\frac{1}{4}$ W.	Greatest rate, } knota. springs, - } flood 3'20 ebb 3'20	W. $\frac{1}{2}$ N.	Greatest rate, } knota. springs, - } flood 3'30 ebb 3'00	
N.N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		
N.N. W.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.		
N.N.W. $\frac{1}{2}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ N.		
N. by W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ N.		
Slack.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		
S.S.E.		S.E. by E. $\frac{1}{4}$ E.		W. $\frac{1}{4}$ S.		
S.S.E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
S.S.E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
S.E. by S.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
S.E. by S.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		

Between { A line joining Beachy Head and Point Ailly, and  
          "     the North Foreland and Dunkerque.

REMARKS.	West of	East of	Off Souths and Head.	Off Norths and Head.
	Line of Separation.		Course.	Rate.
des separate on a line joining— chy Head and St. Valery . . . . .	W. by N.	N.E. by E. ¼ E.	N.E. ¼ E.	N.N.E.
tings and Trepot . . . . .	W. ¼ N.	N.E. by E. ¼ E.	N.E. ¼ E.	N.N.E.
tings and Cayeux . . . . .	W. ¼ N.	E.N.E.	N.F. by E. ¼ E.	N.E. ¼ E.
stone and Calais . . . . .	W. by S.	E.N.E.	N.E. by E. ¼ E.	E. by S.
h Foreland and Point Gravelines . . . . .	s.w. by w. ¼ w.	N.E. by E. ¼ E.		
sgate and Nieuport, passing over North nd Head, the South Line of the Falls, d the banks off Nieuport . . . . .	W. by S.	{ E. ¼ N. and Northward.	{ S.W. ¼ S.	S.S.W.
	Tides meet.			
des meet on a line joining— chy Head and Point Ailly . . . . .	E.S.E.	s.w. by w. ¼ w.	S.W.	S.S.W.
hill and Cayeux, both streams turning wn towards the "Somme" . . . . .	S.S.E. ¼ E.	S. by W. ¼ W.	S.W. ¼ W.	S.S.W.
les meet on a line joining Rye and the le, passing over the Bassurelle, both setting to the Somme . . . . .	S.E. by E ¼ E.	S.W. by W.	W.S.W. ¼ W.	S.S.W.
des meet on a line joining— ngeness and Touquet Point . . . . .	E. by N.	W.S.W. ¼ W.	W. ¼ N.	S.S.W.
ver and Dunkerque nearly . . . . .	N.E. by E. ¼ E.	W.S.W.	N.N.E.	S.S.W.

Great test rate, springs, 3'3 knots.

## SECTION III.

## TIDAL STREAMS IN THE NORTH SEA.

*Streams turn  
with the Tides  
of Dover.*

IN the North Sea the general features of the streams correspond exactly with those of the English Channel, but the *direction* of the stream is reversed. As soon as the intermediate tide is passed, on coming from the westward, a ship enters the True Stream, which extends from the North Foreland to a line joining the Leman and Ower Light and the Texel. To the northward between the Ower and Texel a mixed tide occurs, similar to that which is experienced off the Start, occasioned by the channel stream encountering that of the Offing Stream; and beyond these limits the time of slack water varies with the advance of the tidal hour, as at the entrance of the English Channel; and with this peculiarity also, that in a very short distance there occurs a difference of three hours in the time of slack water.

*Direction of  
True Stream.*

The True Stream will always carry a vessel *towards* the North Foreland while the water is *rising at Dover*, and *from it* while it is *falling at that place*.\* This stream sets nearly N.E. and S.W., except near the coasts, where it partakes of the form of the land; and at the entrance of the Thames where it is diverted from its course by the river. The annexed table will show these deviations and the exact course of the stream in the channel, which, for the convenience of reference, is also divided into compartments.

*North Sea  
divided into 15  
Compartments.*

The 7th compartment comprises the entrance to the Thames; viz., at the Mouse, Sunk, Kentish Knock, and Galloper Light Vessels, and 5 miles north of the North Foreland.

The 8th compartment comprises a space between the mouth of the Thames and the coast of the Netherlands south of 52° N.

The 9th compartment comprises between 52° and 53° N. and the English coast as far as 2° E. and also the Shipwash, Stanford, Saint Nicholas Gat, Cockle, Newarp, and Hasborough Light Vessels.

The 10th compartment comprises between 52° and 53° N. and from 2° to 3° E.

The 11th compartment comprises between 52° and 53° N., and from 3° to 4° E.

The 12th compartment comprises between 52° and 53° N., and from 4° E. to the coast of the Netherlands.

The 13th compartment comprises between 53° and 54° N., and from 1° to 3° E., and the Leman and Ower Light Vessel.

The 14th compartment comprises between 53° and 54° N., and from 3° to 5° E.

The 15th compartment comprises between 53° and 54° N. and westward of 1° E., and the Spurn and Dudgeon Light Vessels.

The 16th compartment comprises from 1° to 8° E. on the parallel of 54° N.

The 17th compartment comprises from 0° to 8° E. on the parallel of 55° N.

The 18th compartment comprises from 1° to 8° E. on the parallel of 56° N.

The 19th compartment comprises from 2° W. to 8° E. on the parallel of 57° N.

The 20th compartment comprises from 3° W. to 3° E. on the parallel of 58° N.

The 21st compartment comprises from 2° W. to 0° on the parallel of 59° N.

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\* Upon the banks lying towards the coast of Holland, between the Texel and the Schelde, where there is scarcely any rise or fall of the water, the stream continues nearly 40 minutes longer than in other parts of the channel.

TABLE showing the MAGNETIC DIRECTION of the TIDAL STREAMS in the NORTH SEA from a line joining the SPURN POINT and HELGOLAND to the NORTH FORELAND at every hour of the tide at DOVER.

## COMPARTMENT VII.

Entrance to the Thames.

Hours.	Mouse Light Ship.		Sunk Light Ship.		Kentish Knock Light Ship.		½ Miles north of North Foreland.		Galloper Light Vessel.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 W. by N.	Greatest rate, springs, 2½ knots.	Slack.	Greatest rate, springs, 3½ knots.	N.E.	Greatest rate, springs, 2½ knots.	N.N.W. ¼ W.	1'80	N.E. ½ E.	Greatest rate, springs, 2½ knots.
	2 Slack.		N.E. by E. ¼ E.		N.E.		N. ¼ E.	1'20	N.E. by E.	
	3 E. ¼ S.		E.N.E. ¼ E.		N.E.		N.E. ¼ E.	1'18	N.E. by E.	
	4 E. ¼ S.		E.N.E. ¼ E.		N.E.		E.S.E. ¼ E.	1'46	N.E. ¼ E.	
	5 E. ¼ S.		E.N.E. ¼ E.		N.E.		E.S.E. ¼ E.	1'60	N.E. by E.	
	6 E. ¼ S.		E.N.E. ¼ E.		N.E.		S.E. ¼ E.	1'45	N.E. by E.	
Before High Water, Dover.	5 E. ¼ S.	Greatest rate, springs, 2½ knots.	..	Greatest rate, springs, 3½ knots.	S.W. ¼ S.	Greatest rate, springs, 2½ knots.	S.S.E. ¼ E.	1'30	S. ¼ W.	Greatest rate, springs, 2½ knots.
	4 Slack.		S.W. by W. ¼ W.		S.W. ¼ S.		S. ¼ W.	1'36	S.W. ¼ S.	
	3 W. ¼ S.		S.W. by W. ¼ W.		S.W. ¼ S.		S.W. ½ S.	1'60	S.W. by W.	
	2 W. ¼ S.		W.S.W. ¼ W.		S.W. ¼ S.		S.W. ½ W.	1'65	S.W. by W. ¼ W.	
	1 W. ¼ S.		W. ¼ S.		S.W. ¼ S.		W.S.W.	1'40	W.S.W.	

## COMPARTMENT VIII.

Between the mouth of the Thames and the coast of the Netherlands south of 52° N. latitude.

Hours.	West of 2° E.		Between 2° and 3° E.		East of 3° E.		REMARKS.
	Course.	Rate.	Course.	Rate.	Course.	Rate.	
After High Water, Dover.	1	N.E. ¼ E.	Greatest rate, springs, { flood 2½ to 3½ knots. ebb 2½ }.	E.N.E. ¼ E.	Greatest rate, springs, { flood 2½ to 3½ knots. ebb 2½ to 3½ }.	N.E. by E. ¼ E.	Stream from the Scheide N.W. by W. to 3° E. turning sharply to N.E. Stream from the Scheide N.W. by W. to 2½ E. turning sharply to N.N.E. ½ E.
	2	N.E. ½ E.		E.N.E.		N.E. by E.	
	3	N.E.		N.E.		N.E. ¼ E.	
	4	N.E. by E. ¼ E.		N.E. ¼ E.		N.E. ¼ E.	
	5	N.E. ½ E.		N.E. ½ E.		N.E. ½ E.	
	6	N.E. ¼ E.		N.E.		N.N.E. ¼ E.	
Before High Water, Dover.	5	S.W. ¼ S.	Greatest rate, springs, { flood 2½ to 3½ knots. ebb 2½ to 3½ }.	S.W. by W. ¼ W.	Greatest rate, springs, { flood 2½ to 3½ knots. ebb 2½ to 3½ }.	W.S.W.	
	4	S.W.		S.W. ½ W.		S.W. ¼ W.	
	3	S.W.		S.W.		S.W. ¼ W.	
	2	S.W.		S.W.		S.W. ½ W.	
	1	S.W. ¼ S.		S.W.		S.W. ¼ W.	

## COMPARTMENT IX.

Between the latitude 52° and 53° N. and the English Coast as far as 2° E. longitude.

Hours.	REMARKS.	
After High Water, Dover.	Stream runs northward.	
1		
2		
3		
4		
5		
Before High Water, Dover.	Stream runs southward.	
1		
2		
3		
4		
5		

Taking the direction of the land, except close to the banks, for which special instructions are necessary.

## TIDAL STREAMS

COMPARTMENT IX.—*continued.*

Hours.	Shipwash Light Vessel.		Stanford Light Vessel.		St. Nicholas Gat Light Vessel.		Cockle Light Vessel.		Newarp Light Vessel.		Hasborough Light Vessel.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ E.		N.N.E.		N. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.	
	2 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ E.		N.N.E.		N. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.	
	3 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ E.		N.N.E.		N. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.	
	4 E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ W.		N.N.E.		N. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.	
	5 N.E. by E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ E.		N. $\frac{1}{4}$ W.		N.N.E.		N. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.	
	6 N.E.		Slack		N. by W.		S. $\frac{1}{4}$ W. on the turn.		N. $\frac{1}{4}$ E.		S. by E.	
Before Low Water, Dover.	1 S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S. by E. $\frac{1}{4}$ E.	
	2 S.W. by W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S. by E. $\frac{1}{4}$ E.	
	3 S.W. by W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S. by E. $\frac{1}{4}$ E.	
	4 S.W. by W. $\frac{1}{4}$ W.		S.W. by S.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S.S.E.	
	5 S.W. by W. $\frac{1}{4}$ W.		S.S.W. $\frac{1}{4}$ W.		S. by W. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S. by E.	
	6 S.W. by W. $\frac{1}{4}$ W.											

## COMPARTMENT X.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and longitude  $2^{\circ}$  to  $3^{\circ}$  E.

Hours.	S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	Rate.	N.W. Quarter.	Rate.	REMARKS.
After High Water, Dover.	1 N.E. $\frac{1}{4}$ N.		N.E.		N.E. $\frac{1}{4}$ N. *		N. by W.		* Turning sharply off for the Leman and Ower.
	2 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ E.		
	3 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ E.		N.N.E. $\frac{1}{4}$ E.		N.N.E. $\frac{1}{4}$ E.		
	4 N.E.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ E.		N. $\frac{1}{4}$ W.		
	5 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ W.		
	6 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. by N.		N.N.E. $\frac{1}{4}$ E.		
Before High Water, Dover.	1 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.		
	2 S.W.		S.W. $\frac{1}{4}$ S.		South.		S. $\frac{1}{4}$ W.		
	3 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S. by W. $\frac{1}{4}$ W.		S. by W.		
	4 S.W.		S.W. $\frac{1}{4}$ S.		S.S.W. $\frac{1}{4}$ W.		S.S.W.		
	5 S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S. by W. $\frac{1}{4}$ W.		
	6 S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S. by W. $\frac{1}{4}$ W.		

## COMPARTMENT XI.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and longitude  $3^{\circ}$  to  $4^{\circ}$  E.

Hours.	S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	Rate.	N.W. Quarter.	Rate.	REMARKS.
After High Water, Dover.	1 N.E.		Slack.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		Stream setting round Texel south-westerly.
	2 N.E.		N.E.		N.E.		N.E. $\frac{1}{4}$ N.		
	3 N.E.		N.E.		N.E.		N.E.		
	4 N.E. $\frac{1}{4}$ N.		N.E.		N.E. $\frac{1}{4}$ E.		N.E.		
	5 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		
	6 N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		
Before High Water, Dover.	1 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S. by E. $\frac{1}{4}$ E.		S.S.E. $\frac{1}{4}$ E.		
	2 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S.S.W.		South.		
	3 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		
	4 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		
	5 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		
	6 S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		

# IN THE NORTH SEA.

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## COMPARTMENT XII.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and from longitude  $4^{\circ}$  E. to the Coast of the Netherlands.

Hours.		REMARKS.
After High Water, Dover.	1 2 3 4 5 6	<p>Stream runs northward.</p> <p>The stream takes the direction of the land, except close to the banks, for which special instructions are necessary.</p> <p>Stream runs southward.</p>
Before High Water, Dover.	3 4 5 6	

## COMPARTMENT XIII.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and from longitude  $1^{\circ}$  to  $3^{\circ}$  E.

	S. W. Quarter.	Rate.	S. E. Quarter.	Rate.	N. E. Quarter.	N. W. Quarter.	Leman and Ower Light Vessel.		REMARKS.
							Course.	Rate.	
1	N. N. W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 2'15" ebb 2'35" } knots.	N. by W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 2'00" ebb 2'30" } knots.	N. N. W. $\frac{1}{4}$ W.	N. $\frac{1}{4}$ W.	N. by W. $\frac{3}{4}$ W.	Greatest rate, springs, 2'0 knots.	Near the north point of Smith's Knoll the rates are, flood 2'6, ebb 3'0 knots.
2	N. W. $\frac{1}{4}$ N.		N. by W. $\frac{1}{4}$ W.		North.	N. $\frac{1}{4}$ W.	N. by W. $\frac{3}{4}$ W.		
3	N. N. W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		N. by E.	N. by W. $\frac{1}{4}$ W.	N. N. W.		
4	N. N. W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		N. N. E.	N. W. $\frac{1}{4}$ W.	N. N. W.		
5	N. N. W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		E. N. E.	S. by W. $\frac{1}{4}$ W.	N. N. W.		
6	-		N. N. E. $\frac{1}{4}$ E.		S. E.	S. $\frac{1}{4}$ E.	Slack.		
7	S. S. E. $\frac{1}{4}$ E.		S. S. E. $\frac{1}{4}$ E.		S. E. $\frac{1}{2}$ S.	S. $\frac{1}{2}$ E.	S. S. E.		
8	S. S. E. $\frac{1}{4}$ E.		S. S. E. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ E.	S. by E. $\frac{1}{4}$ E.	S. S. E.		
9	S. S. E. $\frac{1}{4}$ E.		S. by E.		South.	S. S. E. $\frac{1}{4}$ E.	S. S. E.		
10	S. by E.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.	E. S. E. $\frac{1}{4}$ E.	S. S. E.		
11	S. S. E. $\frac{1}{4}$ E.		S. by W.		South.	N. E. by N.	S. S. E.		

## COMPARTMENT XIV.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and  $3^{\circ}$  to  $5^{\circ}$  E. longitude.

S. W. Quarter.	Rate.	S. E. Quarter.	Rate.	N. E. Quarter.	Rate.	N. W. Quarter.	Rate.	REMARKS.
W. N. W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 1'30" ebb 1'40" } knots.	W. S. W. $\frac{1}{4}$ W.	Greatest rate, springs, { flood 1'35" ebb 1'50" } knots.	W. $\frac{1}{4}$ S.	Greatest rate, springs, { flood 0'50" ebb 1'00" } knots.	S. W. by W.	Greatest rate, springs, { flood 0'90" ebb 1'00" } knots.	In the north-eastern quarter of this compartment the Helgoland stream joins the Channel stream on the falling water at Dover, and the streams split on the rising water at Dover, and a vessel to the northward of $53^{\circ}30'$ on the rising tide will be set down towards Helgoland.
N. N. W. $\frac{1}{4}$ W.		W. S. W. $\frac{1}{4}$ W.		West.		N. W. by W. $\frac{1}{4}$ W.		
N. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		West.		N. W. $\frac{1}{2}$ N.		
N. by E. $\frac{1}{4}$ E.		N. N. W.		N. N. W. $\frac{1}{2}$ W.		N. by W. $\frac{1}{4}$ W.		
N. E. $\frac{1}{4}$ N.		N. E. $\frac{1}{4}$ N.		N. E. $\frac{1}{2}$ N.		N. E. by N.		
N. N. E. $\frac{1}{4}$ E.		N. E. by E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		E. by N.		
E. $\frac{1}{4}$ S.		E. N. E. $\frac{1}{4}$ E.		E. by S.		S. E. by E.		
S. E. $\frac{1}{4}$ S.		E. N. E. $\frac{1}{4}$ E.		E. S. E. $\frac{1}{4}$ E.		S. E. $\frac{1}{2}$ E.		
S. by E.		S. S. W. $\frac{1}{4}$ W.		S. E. $\frac{1}{4}$ E.		South.		
S. by W. $\frac{1}{4}$ W.		S. W. by S.		S. E. $\frac{1}{4}$ S.		S. W. $\frac{1}{4}$ S.		
S. W. $\frac{1}{4}$ S.		S. W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ E.		S. W. $\frac{1}{2}$ S.		Splitting on Texel Island.

## TIDAL STREAMS

## COMPARTMENT XV.

Between the latitude 53° and 54° N. and westward of longitude 1° E.

Hours.	Course.	Rate.	Spurn Light Vessel.		Dudgeon Light Vessel.	
			Course.	Rate.	Course.	Rate.
Before High Water, Dover.	1	N. $\frac{1}{2}$ E.	E.N.E.	Greatest rate, $\frac{1}{2}$ knot.	N. by W. $\frac{1}{2}$ W.	Greatest rate, $\frac{1}{2}$ knot.
	2	N.N.W. $\frac{1}{4}$ W.	S.W. by S.		N.N.W.	
	3	-	S.W. $\frac{1}{2}$ S.		N.W. $\frac{1}{4}$ N.	
	4	S.W.	S.W.		W. $\frac{1}{4}$ S.	
	5	S.W. $\frac{1}{2}$ W.	S.W.		S.W. $\frac{1}{4}$ S.	
	6	S.W. $\frac{1}{4}$ S.	S.W.		S. $\frac{1}{4}$ E.	
	7	S. $\frac{1}{2}$ E.	S.W.		S. by E. $\frac{1}{4}$ E.	
	8	S. by E. $\frac{1}{4}$ E.	N.E. by E.		S.S.E.	
	9	S.S.W. $\frac{1}{4}$ W.	N.E. by E. $\frac{1}{4}$ E.		S.E.	
	10	N. by E. $\frac{1}{4}$ E.	E.N.E.		E. $\frac{1}{4}$ S.	
After High Water, Dover.	1	N.N.E. $\frac{1}{4}$ E.	E.N.E.		N.E. $\frac{1}{2}$ N.	

## COMPARTMENT XVI.

On the parallel of 54° N.

Hours.	1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
Before High Water, Dover.	1	N. by W. $\frac{1}{4}$ W.	N.N.W. $\frac{1}{2}$ W.	Greatest rate, $\frac{1}{2}$ knot.	N.W. $\frac{1}{4}$ W.	Greatest rate, $\frac{1}{2}$ knot.	N.W. by W. $\frac{1}{4}$ W.	Greatest rate, $\frac{1}{2}$ knot.
	2	N. by W. $\frac{1}{4}$ W.	N.W. $\frac{1}{4}$ N.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.	
	3	N.W. by N.	N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. by N.	
	4	S. $\frac{1}{4}$ E.	W.N.W. $\frac{1}{2}$ W.		N.W. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ W.	
	5	S. $\frac{1}{2}$ E.	W. $\frac{1}{4}$ S.		N. by W.		N.E. $\frac{1}{2}$ N.	
	6	S.S.E.	S. by E.		E. by N.		E. by N.	
	7	S.E. $\frac{1}{4}$ S.	S.E. $\frac{1}{4}$ S.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.	
	8	S.E. by E.	S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.	
	9	E. $\frac{1}{4}$ S.	S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		E. by S.	
	10	N.E. $\frac{1}{4}$ N.	S.E. by E. $\frac{1}{4}$ E.		E.S.E.		S.E.	
After High Water, Dover.	1	N. by E. $\frac{1}{4}$ E.	E.N.E. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.		S. by E. $\frac{1}{4}$ E.	

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
Before High Water, Dover.	1	N.W. by W. $\frac{1}{4}$ W.	W. by N.	Greatest rate, $\frac{1}{2}$ knot.	West	Greatest rate, $\frac{1}{2}$ knot.	E.N.E. $\frac{1}{4}$ E.	Greatest rate, $\frac{1}{2}$ knot.
	2	N.W. by W.	W.N.W.		W.N.W.		N.E. $\frac{1}{4}$ E.	
	3	W.N.W.	W.N.W.		W.N.W.		N.W.	
	4	W.N.W.	W. by N.		W.N.W.		W.N.W.	
	5	W.N.W.	W.N.W.		W.N.W.		N.W. by W.	
	6	W.N.W.	W.N.W.		W.N.W.		W. $\frac{1}{4}$ S.	
	7	E.S.E. $\frac{1}{4}$ E.	S.E. by E. $\frac{1}{4}$ E.		S.S.E. $\frac{1}{4}$ E.		W. by S.	
	8	S.E. by E. $\frac{1}{4}$ E.	S.E. by E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		S.S.W. $\frac{1}{4}$ W.	
	9	S.E. $\frac{1}{4}$ E.	E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ E.	
	10	S.E. $\frac{1}{4}$ E.	E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		S.E. by E.	
After High Water, Dover.	1	S.E. by E. $\frac{1}{4}$ E.	E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.	

About the meridian of 8° E. the influence of the Elbe and Weser causes the stream to run nearly two hours to the north-eastward on the falling tide after it has turned westward in other parts, and on the rising tide to run two hours to the westward after the stream has turned eastward in a more westerly meridian.



## COMPARTMENT XVII.

On the parallel of 55° N.

Hours.	0° E.		1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.N.W.	½	Slack.		N.N.E.		W. ¼ S.		N.W. ½ N.	
	2 S. by W. ¼ W.	½	S.W. ¼ W.		W.S.W.		W. ¼ N.		N.W. ¼ W.	
	3 S. by E.	1 ¼	S.S.W. ¼ W.		W.S.W. ¼ W.		W. ¼ N.		N.W.	
	4 S. ¼ E.	1	S. by W. ¼ W.		S.W. by W.		N.W. by W.		N.W. ¼ W.	
	5 S. ¼ E.	½	S. by W. ¼ W.		S. ¼ E.		S.W. by W. ¼ W.		West.	
	6 S. ¼ E.	¼	S. ¼ W.		S. by E. ¼ E.		S. by E.		S.S.E. ¼ E.	
Before High Water, Dover.	1 S.E. ¼ S.	¼	S. ¼ E.		S.E. ¼ E.		S. ¼ E.		S.E. by E. ¼ E.	
	2 N.N.E. ¼ E.	½	E.N.E. ¼ E.		E. ¼ S.		S.E. by E.		S.E. by E. ¼ E.	
	3 N. ¼ W.	1 ½	N. by E. ¼ E.		E. by N.		E. by S.		E. ¼ S.	
	4 N. ¼ W.	1	N.N.E.		E. ¼ N.		E. by S.		E. ¼ N.	
	5 N. ¼ W.	½	N. by E. ¼ E.		N.E. by E.		N.E. by N.		N. by E. ¼ E.	
			Greatest rate at springs 1 knot about half tide.		Greatest rate at springs 1 knot about half tide.		Greatest rate at springs 1 knot about half tide.		Greatest rate at springs 1 knot about half tide.	

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.W.		W. ¼ N.		W.N.W. ¼ W.		N. by W. ¼ W.	
	2 W.N.W. ¼ W.		W.N.W.		W.N.W. ¼ W.		N. by W. ¼ W.	
	3 W.N.W. ¼ W.		N.W. by W. ¼ W.		N.W. by W. ¼ W.		N.W. ¼ N.	
	4 N.W. by W. ¼ W.		W.N.W. ¼ W.		W.N.W. ¼ W.		N.N.W. ¼ W.	
	5 W. ¼ N.		W.N.W. ¼ W.		W. by N.		N.W.	
	6 Turning.		N.W. by W. ¼ W.		W. ¼ S.		N.W. by W. ¼ W.	
Before High Water, Dover.	1 E. ¼ S.		S.E. ¼ S.		S.W. ½ W.		W. ¼ S.	
	2 E.S.E. ¼ E.		S.E. by S.		S. ¼ E.		S. by W. ¼ W.	
	3 E.S.E. ¼ E.		S.S.E. ¼ E.		S.S.E. ¼ E.		S. ¼ W.	
	4 E.S.E. ¼ E.		S.S.E. ¼ E.		S.E. by S.		S. ¼ E.	
	5 E. ¼ S.		S.S.E. ¼ E.		S.E. by S.		S. by E. ¼ E.	
			Greatest rate at springs 1 knot about half tide.		Greatest rate at springs 1 knot about half tide.		Greatest rate at springs 1 knot about half tide.	

## COMPARTMENT XVIII.

On the parallel of 56° N.

Hours.	1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.N.E. ¼ E.		Slack.		N.W. ¼ W.		N. ¼ E.	
	2 Slack.		S.W. ¼ W.		W.N.W.		N.N.W. ¼ W.	
	3 S. ¼ W.		S.W. ¼ W.		N.W. ¼ N.		N.W. ¼ W.	
	4 S. ¼ E.		W. by S.		N.W.		N.E. ¼ E.	
	5 S. ¼ E.		S. ¼ E.		N. by W. ¼ W.		N.E. by E. ¼ E.	
	6 S. ¼ E.		S. ¼ E.		N. ¼ W.		E. ¼ S.	
Before High Water, Dover.	1 S.E. by E. ¼ E.		E. by S.		N. by E. ¼ E.		E. ¼ N.	
	2 N.E. by E. ¼ E.		E.N.E. ¼ E.		N.E. ¼ E.		E. ¼ N.	
	3 N.E. ¼ N.		E.N.E.		East.		N.E. by E. ¼ E.	
	4 N.E. by N.		N.E. by E. ¼ E.		N.E. by E.		E.N.E. ¼ E.	
	5 N.E. ¼ E.		N.E. by E.		North.		N.E. by E. ¼ E.	
			Greatest rate at springs ¼ knot about half tide.		Greatest rate at springs ¼ knot about half tide.		Greatest rate at springs ¼ knot about half tide.	

COMPARTMENT XVIII.—*continued.*

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	Turning.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	Slack.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	E.N.E. $\frac{1}{2}$ E.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.	N.E. $\frac{1}{2}$ E.	Greatest rate at springs $\frac{1}{2}$ knot about half tide.
	W. $\frac{1}{2}$ S.		N.N.W.		N.E. by N.		N. $\frac{1}{2}$ E.	
	N.W. $\frac{1}{2}$ N.		N.N.W.		N. $\frac{1}{2}$ E.		N. $\frac{1}{2}$ W.	
	N. by W. $\frac{1}{2}$ W.		N. by W. $\frac{1}{2}$ W.		N. $\frac{1}{2}$ W.		N. by W.	
	N.N.E. $\frac{1}{2}$ E.		N. $\frac{1}{2}$ W.		N. $\frac{1}{2}$ W.		N. by W.	
	N.E. $\frac{1}{2}$ E.		N.N.E.		N. by W.		N. by W.	
Before High Water, Dover.	E.N.E. $\frac{1}{2}$ E.		N.E. by E. $\frac{1}{2}$ E.		N. by W.		N.N.W. $\frac{1}{2}$ W.	
	N.E. by E. $\frac{1}{2}$ E.		E.N.E. $\frac{1}{2}$ E.		N.E. $\frac{1}{2}$ E.		N. by E.	
	E.N.E. $\frac{1}{2}$ E.		E. $\frac{1}{2}$ N.		E. $\frac{1}{2}$ S.		S. by W.	
	East.		E. $\frac{1}{2}$ S.		E. $\frac{1}{2}$ S.		S.W.S.	
	E. $\frac{1}{2}$ N.		E. by S.		S.E. $\frac{1}{2}$ E.		S.W. $\frac{1}{2}$ W.	

## COMPARTMENT XIX.

On the parallel of 57° N.

Hours.	2° W.		1° W.		0	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	S. W. by S.	Greatest rate $1\frac{1}{2}$ knots at half tide.	S. by W. $\frac{1}{2}$ W.	Greatest rate $1\frac{1}{2}$ knots at half tide.	S. by W. $\frac{1}{2}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.
	S. W. by S.		S.W. $\frac{1}{2}$ S.		S.S.W.	
	S. W. $\frac{1}{2}$ W.		S.W.		S. by W.	
	N. $\frac{1}{2}$ W.		W.S.W. $\frac{1}{2}$ W.		S. by W.	
	Slack.		Slack.		S. $\frac{1}{2}$ E.	
	N.N.E. $\frac{1}{2}$ E.		N. by E. $\frac{1}{2}$ E.		Slack.	
Before High Water, Dover.	N.E. $\frac{1}{2}$ N.		N.N.E.		N.N.E. $\frac{1}{2}$ E.	
	N.E.		N.N.E.		N. by E.	
	N.E. by N.		N.N.E. $\frac{1}{2}$ E.		N. by E. $\frac{1}{2}$ E.	
	N.E. by N.		N.E. $\frac{1}{2}$ N.		N.N.E. $\frac{1}{2}$ E.	
	South.		E.N.E.		N. by E. $\frac{1}{2}$ E.	

Hours.	1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	S.S.W. $\frac{1}{2}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.	N. by E. $\frac{1}{2}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.S.E. $\frac{1}{2}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.W. $\frac{1}{2}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.
	S.W. $\frac{1}{2}$ S.		S. $\frac{1}{2}$ E.		South.		N.W. by W. $\frac{1}{2}$ W.	
	S.S.W. $\frac{1}{2}$ W.		S. by E.		S. by W. $\frac{1}{2}$ W.		W.N.W.	
	S.W. $\frac{1}{2}$ S.		S.E. by S.		S.W. by W. $\frac{1}{2}$ W.		N. by W. $\frac{1}{2}$ W.	
	Slack.		E. by S.		Slack.		N. by W.	
	N.E. $\frac{1}{2}$ E.		E. $\frac{1}{2}$ N.		Slack.		N. by E.	
Before High Water, Dover.	N.E. $\frac{1}{2}$ E.		E. $\frac{1}{2}$ N.		Turning.		N.N.E. $\frac{1}{2}$ E.	
	N.E. by E.		E. by N.		N.E. by N.		N.E. $\frac{1}{2}$ N.	
	E.N.E. $\frac{1}{2}$ E.		East.		N.E. $\frac{1}{2}$ E.		N.E. by E. $\frac{1}{2}$ E.	
	E.N.E. $\frac{1}{2}$ E.		East.		E. by N.		E.N.E.	
	Slack.		S. $\frac{1}{2}$ E.		S.E. by E. $\frac{1}{2}$ E.		E. $\frac{1}{2}$ S.	

COMPARTMENT XIX.—*continued.*

Hours.	5°		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N. by E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	8. by E.	Greatest rate $\frac{1}{2}$ knot about half tide.	E.N.E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.S.E.	Rate 0.9 knot.
	2 N.E. by N.		South.		E.N.E. $\frac{1}{4}$ E.		Slack.	
	3 S.W.		S. by W.		E.N.E.		N.E. by N.	
	4 N.N.W.		N.N.E.		E.N.E.		N.E. $\frac{1}{4}$ N.	
	5 N. $\frac{1}{4}$ W.		North.		E.N.E.		North.	
	6 N. by E. $\frac{1}{4}$ E.		North.		N.N.E.		N. by E.	
Before High Water, Dover.	5 N.E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N. by E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N.E. $\frac{1}{4}$ E.	Rate 0.9 knot.
	4 N.E.		N.N.E. $\frac{1}{4}$ E.		N.E. by N.		N.N.E. $\frac{1}{4}$ E.	
	3 N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ E.		N.E.		N.E. by E. $\frac{1}{4}$ E.	
	2 E. $\frac{1}{4}$ N.		E. by N.		N.E.		N.E. by E. $\frac{1}{4}$ E.	
	1 E. East.		E. by N.		N.E.		E.N.E. $\frac{1}{4}$ E.	

## COMPARTMENT XX.

On the parallel of 58° N.

Hours.	3° W.		2° W.		1° W.		°	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 South.	Greatest rate 1 knot about half tide.	S.E.	Greatest rate 0.6 knot about half tide.	S.S.W.	Greatest rate 1 knot about half tide.		
	2 S.E. $\frac{1}{4}$ S.		S.E.		S.S.W.			
	3 East.		S. $\frac{1}{4}$ E.		S.S.W.			
	4 E. by S.		S.E. $\frac{1}{4}$ S.		Slack.			
	5 Slack.		Slack.		N.N.W. $\frac{1}{4}$ W.			
	6 S.W.		N. by W.		N.N.E.			
Before High Water, Dover.	5 W. $\frac{1}{4}$ N.	Greatest rate 1 knot about half tide.	N.W. $\frac{1}{4}$ W.	Greatest rate 1 knot about half tide.	N.N.E. $\frac{1}{4}$ E.	Greatest rate 1 knot about half tide.		
	4 W.N.W. $\frac{1}{4}$ W.		N.W.		N.E.			
	3 N.W. by W. $\frac{1}{4}$ W.		N.W. by N.		N.E. $\frac{1}{4}$ E.			
	2 W. by N.		W. $\frac{1}{4}$ N.		S.S.E. $\frac{1}{4}$ E.			
	1 W. $\frac{1}{4}$ N.		S. $\frac{1}{4}$ E.		S.S.E. $\frac{1}{4}$ E.			

Hours.	1° E.		2° E.		3° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.W.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.W.	Greatest rate $\frac{1}{2}$ knot about half tide.	S. by E.	
	2 West.		W.S.W.		S. $\frac{1}{4}$ E.	
	3 Slack.		W.N.W. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.	
	4 Slack.		N.W. $\frac{1}{4}$ N.		S.S.W.	
	5 N.N.E.		N. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.	
	6 N.N.E.		N. by E.		E. by N.	
Before High Water, Dover.	5 N.N.E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N. by E.	Greatest rate $\frac{1}{2}$ knot about half tide.	E.N.E.	
	4 N.N.E.		N. by E. $\frac{1}{4}$ E.		E.N.E.	
	3 N. by E. $\frac{1}{4}$ E.		N. by E.		E. by N.	
	2 Turning.		N.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.	
	1 W. by N. $\frac{1}{4}$ N.		S.E.		S.E. by E.	

TIDAL STREAMS.

COMPARTMENT XXI.

On the parallel of 59° N.

Hours.	2° W.		1°		°	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.W. by S.	Greatest rate 1 knot about half tide.	S.S.W. ½ W.	Greatest rate 0·6 knot about half tide.	W.S.W.	Greatest rate ½ knot about half tide.
	2 S. by W. ¼ W.		S.W. by S.		W.S.W. ¼ W.	
	3 S. ¾ W.		S.W. by S.		N. by E. ½ E.	
	4 S.W. by W. ½ W.		Slack.		N.E.	
	5 W. by N.		Slack.		N.E. ¼ E.	
	6 N.W. ½ W.		N. ¾ E.		N.E. by E.	
Before High Water, Dover.	5 N.N.W. ¾ W.	Greatest rate 1 knot about half tide.	N.N.W.	Greatest rate 0·6 knot about half tide.	N.E. by E.	Greatest rate ½ knot about half tide.
	4 N.W. ½ N.		N.N.W.		E. by N.	
	3 W.N.W.		N.W. by N.		S.E. ¼ E.	
	2 S.W. by W. ½ W.		S.W. by W. ¼ W.		S.S.W. ½ W.	
	1 S.W. ¼ W.		S.W. ¾ S.		W.S.W.	

All the foregoing bearings are magnetic.

**TIME**  
**OF**  
**HIGH WATER ON FULL AND CHANGE DAYS;**  
**WITH THE RISE OF THE TIDE**  
**AT SPRINGS AND NEAPS.**

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*As it is desirable that the following list should be made accurate and complete, it is requested that corrections and additions be forwarded to the Secretary of the Admiralty.*

# TIME

OF

## HIGH WATER ON FULL AND CHANGE DAYS

AT THE PRINCIPAL PLACES ON THE GLOBE;

AND ACCORDING TO THE APPARENT PROGRESS OF THE TIDE WAVE

*With the Rise of the Tide at Springs and Neaps.\**

thus?, is placed after the Time of High Water and the Rise, it indicates that what are given are approximations.)

	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>England, South Coast.</i>							
	h. m.	ft.	ft.		h. m.	ft.	ft.
gnes)	4 30	16	12	Torbay - -	6 0	13½	10
lary)	4 27	16	12	Exmouth - -	6 21	12¼	8½
	4 30	16½	12½	Lyme Regis -	6 21	11½	8½
ran }	5 0	14½	10½	Bridport - -	6 5	11¼	7½
- }	4 35	14½	11½	Chesilton -	6 13	10¼	7
- }	4 43	15½	11½	Portland Break- }	7 1	6¾	4½
nce)	4 57	16	12	water - - }	9 10	6½	4¾
- }	5 5	10	6	Poole - -	12 45	5	
uro }	5 4	15½	12	Christchurch -	9 0	7½	5
r) - }	5 14	15	11¾	Needles Point -	11 30	7½	6
- }	5 26	16	13	Hurst, Camber -	9 46	7½	6
- }	5 37	15½	11½	Yarmouth - -	10 0	7	6½
water }	5 32	15½	11½	- - }	12 0	12½	9½
on }	5 43	15½	11½	West Cowes -	11 45	8	6
Yard }	5 45	15	11	Lymington - -	10 25	10	8½
mar }	5 47	14¾	10¾	- - }	12 15	13	9½
- }	5 55	13½	9½	Beaulieu - -	10 25	13	9½
- }	6 6	12½	8½	Calshot - - }	12 15	10 30	13
- }	6 12	10½	6½	(Castle Point) }	10 30	10 42	8½
- }	6 17	5¼	1¼	Southampton -	12 45	12 57	8½
ay, }	5 47	14½	10½	- - }	10 42	11 41	13½
ivy }	5 47	8½	4½	Red- }	12 57	11 46	10¼
eam }	5 37	16½	11½	bridge - - }	11 48	6½†	4†
rme }	5 40	16½	11½	Portsmouth Dock }			
von }	5 47	16½	11½	Yard - - }			
- }	5 45	15½	11½	Port- }			
- }	5 41	15	11½	chester (off the }			
ss- }	5 46	10		Castle) - - }			
- }	6 16	14¼	10½	Ports- }			
- }	6 0	13	9½	bridge (a ¼ mile }			
				W. of bridge) - }			

\* of the tide is meant its vertical rise above the mean low water level of spring-tides.

† Above the bed of the lake.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Portsmouth Fareham (in Channel close to the Upper Quay) -	h. m.	ft.	ft.	Caldy Island -	h. m.	ft.	
Bridge -	11 48	11½	8½	Tenby -	6 0	24?	
Ryde -	11 51	7½	4½	Milford (St. Ann Lighthouse) -	5 56	24	
Bembridge Point -	11 20	13½		Pembroke Dk. Yard -	6 12	21	
Chichester -	11 0	14	10½	Benton Castle, Cleddau R. -	6 23	20	
Pagham (entrance) -	11 30	14	11	Landshipping " -	6 27	20	
Selsea Bill -	11 30	16½	12½	Little Milford Quay -	6 31	19	
Littlehampton -	11 45	16½	12½	Haverfordwest " -	6 42	7½	
Arundel (Bar) -	11 36	16	11½	Smalls Light-house -	6 0	21	
Arundel (Town) -	11 35	16	11½	Ramsay Sound -	6 0	17	
Shoreham -	12 25	18	13½	Fishguard -	6 56	11½	
Brighton -	11 34	16	12	Newport -	7 0	12	
Newhaven -	11 15	20	15	Cardigan -	7 1	12	
Beachy Head -	11 51	20	15	New Quay -	7 30	15	
Hastings -	11 20	24	17½	Aberystwyth -	7 31	13½	
Rye Bay -	10 53	22	17½	Aberdovey -	8 0	15	
Dungeness -	11 20	21½	19	Sarn-y-bwch Reef -	7 40	14	
Folkstone -	10 45	20	16½	Barmouth -	7 41	17	
Dover -	11 7	18½	15	Sarn Badrig -	7 30	13	
Deal -	11 12	16	12½	Port Madoc -	7 30	17	
Ramsgate -	11 15	15	12	St. Tudwall Road -	7 45	14	
	11 44			Pwllheli -	7 46	13½	
<i>England and Wales, West Coast.</i>				Bardsey Id. -	7 40	15	
Scilly Isles -				Porth-dyn-lleyn -	8 30	16	
(St. Agnes) -	4 30	16	12	Caernarvon -	9 33	13½	
Scilly Isles (St. Mary) -	4 27	16	12	Holyhead -	10 11	16	
Cape Cornwall -	4 35	18?	13?	Amwlch -	10 30	18?	
St. Ives -	4 44	21	15	Beumaris -	10 32	21½	
Padstow -	5 13	20½	16½	Air Point, R. Dee -	10 54	25	
Boscastle -	5 15	25	17½	Chester (Crane Wharf) -	12 16	26	
Budehaven -	5 45	23	17	Liverpool -	11 23	26	
Lundy Island -	5 15	27	20	Formby Point -	10 35	28	
Barnstaple (Bar) -	5 30	19	14	Ribble Lighthouse -	10 51	24	
Barnstaple (Bridge) -	6 28	10½	7½	Preston -	11 49	10	
Appledore -	5 58	23	16½	Fleetwood (Wyre Lt) -	11 11	27	
Bideford -	6 7	16	12	" (Port) -	11 12	26½	
Ilfracombe -	5 42	27½	21½	Lancaster -	11 16	8½	
Minehead -	6 30	35	26½	Poulton-le-Sands -	11 26	27½	
Bridgewater Bar -	6 50	35	26½	Piel Harbour (Pier) -	11 5	28	
Weston-super-mare -	6 54	37	28½	Whitehaven -	11 14	23½	
Flatholm Islands -	6 54	37?	28?	Port Harrington -	11 5	26	
Portishead -	7 16	41½	31	Workington -	11 4	20	
Bristol (King Road) -	6 56	44	33	Maryport -	11 3	18	
Chepstow -	7 30	38	28½	Abbey Head -	11 10	23	
Newport -	7 10	38	29	Southernness -	11 20	28	
Cardiff -	6 59	38	29	Annan Foot -	11 56	30	
Nash Point -	6 25	33	25	Port Carlisle -	12 10	30	
Swansea. (Mumbles Lighthouse) -	6 1	27½	20½	Point of Ayr -	11 7	20?	
Porth Cawl -	6 8	28½	21½	Douglas, I. of Man -	11 12	20½	
Burry Port -	6 1	25½	18½	Ramsey -	11 12	19½	
Llanelly (Bar) -	6 16	28	21	Peel -	11 8	16½	
Caermarthen (Bar) -	6 10	26	19½	Calf Sound -	11 17	16½	
				Port St. Mary -	11 10	20	
				Castletown -	11 10	30	



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Scotland, West Coast.							
	h. m.	ft.	ft.		h. m.	ft.	ft.
Farn Point)	11 22	23	18	Duart, I. of Mull -	5 0	12	10
bright -	11 10	23		Loch Aline -	5 33	13½	10½
Stewart } Quay) -	12 0	12	6	Tobermory " -	5 36	13	9½
-	11 30			Loch Sunart -			
own -		17	12	Iona Sound -	5 11	11½	8½
William -	11 10	18	10	Bunessan -	5 24	12	8½
Galloway -	11 15	15½	12½	Loch Tnadh (Go-	5 29	11½	8
rick -	11 10	15	12	metra) I. of Mull }			
an -	11 12	11	8	Scarnish, Tiree I. -	5 31	11½	8½
Dantyre -	10 35	4		Arinagour, Coll I. -	5 39	12½	9½
lton -	11 45	8½	6	Loch Moidart -	5 44	13½	9½
-	11 49	10	7	Arasaig -	5 50	13½	10
-	11 50	8½	7½	Loch Nevis -	5 47	14½	10
n -	11 50	10	7½	Loch Hourn -	5 45	13½	10½
Head -	11 49	10	8	Ornsay, I. of Skye -	5 50	14½	10½
Great }	11 50	10	6	Kyle Rhea -	6 0	15	11
ae -	11 50	10		Loch Duich -	6 0	15½	11
-	0 8	9½	8½	Loch Alsh (Kyle	6 16	15½	11
sgow -	0 18	9		Akin) }			
on -	0 20	9		Loch Carron	6 29	16½	11½
-	0 39	9		(Plockton) }			
(Canal	1 15	9	7½	Portree, I. of Skye	6 32	15	10½
ice) -	1 25	9		South Rona, Light	6 20	14½	10½
ng -	12 6	12		House -			
al -	12 6	10	6	Loch Torridon -	6 20	15	11
ivan -	11 55	6		Barra, North Harb. -	5 48	11½	8½
es, Kyles }	11 50	10	8	Canna Island -	6 19	14	9½
-	11 50	9	6	Loch Boisdale,	5 47	12½	9½
ig, Loch }	11 53	9	7½	South Uist }			
-	12 0	10		Loch Dunvegan	6 7	15½	11
und -	2 22	4	2½	(Dunvegan Cas-			
n, Islay -	5 0	5	4	tle, I. of Skye) }			
lin Ferry -	4 41	6½	4½	Kallin, North	5 59	13½	9½
all Isles -	5 3	3½	2½	Uist }			
-	4 49	6½	5	Monach Islands	5 44	12½	8½
land -	5 2	11½	7	(Shillay) -			
-	5 28	10	7½	Loch Eport, N. Uist -	6 6	12½	9½
ound -	5 10	10-12		Loch Maddy,	6 6	12½	9½
an, Loch }	5 31	9	6½	North Uist }			
m -	5 22	12	9½	Vallay " -	6 10	11½	8½
l, Loch }	7 3			Berneray I. (Sound	6 11	13	9½
-	7 54	5½		of Harris) -			
in, Loch }	5 26	12½	8½	Obb of Harris -	6 16	11½	8½
ish, -				East Loch Tarbert -	6 10	13½	10
evan -	5 43	11		West Loch Tarbert -	6 4	11½	8½
loch Aber -	5 43	12	8½	Loch Seaforth }	6 16	15	10
" -	5 59	11½		(Athline) -			
(Head of	6 27			Loch Clay " -	6 9	14½	9½
-				Loch Ewe (Poolewe)	6 39	14½	10½
				Loch Broom }			
				(Ullapool) -	6 40	14½	10½
				Tanera, Summer I. -	6 37	14	10½
				Loch Inver -	6 41	14	11
				Loch Erisort, }			
				Lewis Id. -	6 43	15½	11½
				Stornoway " -	6 46	13½	9½
				Loch Roag (Ber-	6 11	11	8
				nera) Lewis I. -			
				St. Kilda -	5 30		
				Rockall -	3 30	12	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
Loch Laxford -	6 44	15	11½	<i>England, East Coast.</i>			
Cape Wrath -	7 30	15½	11	Holy Island Harb.	2 30	15	1
Loch Eriboll -	7 43	14½	11	North Sunderland	2 30	15	1
Loch Tongue -	7 53	15	12	Coquet Road -	3 0	14½	1
Thurso -	8 28	14½	11	Blyth -	3 15	15	1
Stroma, S. side -	9 47	9	6½	Tyne River (Bar)	3 20	14½	1
Swona, E. side -	10 24	10	7½	" North Shields }	3 23	13½	1
" W. side -	9 35	10	7	(Low Lt. Hse.) }			
Great Skerry, E. side -	11 4	9½	6	" Howden -		12	
" W. side -	10 53			" Walker -		10½	
<i>Orkneys.</i>				" Newcastle -	4 23	10½	
Stromness -	9 0	10	7½	Sunderland -	3 22	14½	
Westness -	9 11	10	7½	Seaham -	3 24	14½	
Kirkwall -	10 9	10	7½	Hartlepool -	3 28	15	
Deer Sound -	10 30	10	7½	Tees River, Bar -	3 45	15	
Widewall -	9 3	10	7½	" Middlesbrough	3 55	13	
Otterswick -	9 13	11	8	" Stockton -	4 40	11	
<i>Shetland Isles.</i>				Whitby -	3 45	15	
Balta -	9 45	6	4½	Scarborough -	4 11	15½	
Lerwick -	10 30	6	4	Filey Bay -	4 20	16	
Hillswick, or Urie } Firth -	9 45	6½	5	Flamborough Head	4 30	16	
Sealloway -	9 30	5½	4½	Bridlington -	4 39	16	
Sumburgh Head -	9 45			Humber River, } Spurn Point -	5 26	18½	1
Fair Isle -	11 0	5	3½	" Grimsby -	5 36	19½	1
<i>Scotland, East Coast.</i>				" Killingholme	6 2	19½	1
Duncansby Ness -	10 14	10	7	" Hull -	6 29	20½	1
Wick -	11 22	10	7½	Humber Ouse } River, Goole	7 44	14	
Dornock Road -	11 47	11		Boston Deep, Clay } Hole -		21½	
Cromarty -	11 56	14	11	" Hob Hole -		17	
Inverness (Kellock Pier) -	12 18	12	9½	" (Sluice) -	7 0	12	
Banff -	0 28	10½	8	Lynn Deep, Long } Sand -	6 0	23	
Fraserburgh -	0 40	11	8½	" Lynn Road -		20	
Peterhead -	0 34	10½	8½	" Lynn -		18	
Aberdeen -	1 0	12	10	Wisbeach Eye -		20	
Stonehaven -	1 10	14	11	Sutton Bridge -		18	
Montrose -	1 25	13	10	Wisbeach -	7 30	15	
Arbroath -	1 35	14	11	Wells Bar -	6 20	18	
Tay River (Bar) -	2 6	16	14	Wells -	7 0	12	
Broughty Ferry -	2 22	14½	11	Blakeney Bar -	6 30	15	
Dundee -	2 32	14½	11½	Blakeney -		9	
Perth -	3 35			Cley -		5½	
Cockenzie, Firth of Forth -	2 16	15½	13	Cromer -	7 0	14½	
Leith -	2 17	16½	12½	Leman Shoal -	6 0		
Granton Pier -	2 20	16	12½	Ower Shoal -	6 30		
Burntisland -	2 24	16½	12½	Hammond Knoll -	7 40		
Queensferry -	2 37	18	14	Winterton Ridge -	7 50		
Kincardine -	2 53	17½	15	Yarmouth Road -	9 15	6	
Alloa -	3 18	17½	15	" Haven, Brush } Bridge		5½	
Stirling -	3 52	7½	4½	Lowestoft -	9 57	6½	
Dunbar -	2 8	14½	11	Blyth River, South } wold	10 20	6½	
Eyemouth -	2 15	15½	11½	Aldborough -	10 45	8?	
Berwick -	2 18	15	11½	Kentish Knock -	11 47		
				Orfordness -	11 15	8	

	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
-	11 30	8?	6?	Youghal -	5 14	12½	10
en Bar -	11 30	7½		Ballinacourty, -			
-	12 36	7½		Dungarvan - }	5 12	12½	9½
iden -	1 0	7½		Dunmore -	5 27	12½	9½
Bridge -	3 0	6		Waterford (Dun-			
haven - }	11 45	12	9	cannon Fort) - }	5 20	12½	10
on Quay -	12 35	10		(Bridge) -	6 6	13½	10½
d Bridge -	12 55	7		New Ross -	6 4	12½	10
rbour -	12 6	11½	9¼	Saltees -	5 40		
-	12 6	12½	10	Wexford -	7 21	5	3½
r, Pin- }	12 20	12		Kilmichael Point -	8 30	4½	3
aham - }				Arklow -	8 45	4	3
ch - }	12 27	12		Wicklow -	10 29	9	6½
f, - }				Bray Head -	10 45	12	9½
wich - }	12 35	13½		Dalkey Island -	10 45	13	11
River, }				Kingstown -	11 10	11	8½
y Quay -	12 29	12		Dublin Bar (Pool-	11 12	12-14	9-11
rade - }	12 48	11½		beg Lt. House) }			
dge - }	1 8	4½		Howth Harbour -	11 9	13	10
Colne - }				Malahide Inlet -	11 15	10	8
hoe - }	12 0	14	10	Rogerstown Inlet -	11 15	10½	8
River, - }	12 10	15	10½	Skerries Islands -	11 0	13	10
int - }	12 0	14½	10	Balbriggan -	10 40	11	
idge - }	12 20	12	8	Drogheda (Bar) -	11 0	11½	9
River, - }	12 32	10	6	Dundalk -	10 56	13½	11½
l, N.E. - }	11 40	12	8	Greencastle Point -	11 2	14	11½
River, - }	12 5	14½	10½	Carlingford (Bar) or	11 0	14	11
Bridge -	12 25	16	11	Cranfield Point.			
it -	12 5	14½	10½	" Warrenpoint -	11 10	14½	12
le -	11 40	15½	13	Newcastle -	10 30	16	12
-	12 0	15½	13	Ardglass -	11 0	16	12
-	12 30	15½	13	South Rock -	10 58	13	10½
-	0 37	16	13½	Lough Strangford }			
-	1 2	17½	14	(Killard Point) }	10 53	14	11½
-	1 10	17½	14	" Strangford }			
-	1 37	18½	15½	Quay - }	12 31	10½	8½
-	1 43	19	15	" Quoile Quay -	12 45	11	9½
ks -	1 57	19½	17	" Kircubbin -	12 42	11½	9½
ige -	2 7	19½	16½	" Killyleagh -	12 40	11	9½
				Head of the Lough }	12 44	11½	9½
				(Turley Rocks) }			
<i>Ireland, South and East Coasts.</i>				<i>Ireland, West Coast.</i>			
-	4 0	9	6½	Cape Clear -	4 0	9	6½
-	4 23	10½	8½	Skull -	4 2	9½	7½
end -	4 21	10½	8	Crookhaven -	4 9	9½	8
Bay -	4 30	11	8½	Dunmanus Harbour	3 57	9½	7½
erry -	4 36	10½	8½	Dunbeacon -	3 51	10½	7½
-	4 43	11½	9	Black Ball Harbour	3 40	9½	7½
-	5 1	11½	9	Castletown, Bear-			
enrose }	4 58	12½	10	haven - }	4 14	9½	7½
-	4 54	12	9½	Bantry Harbour -	3 47	10	7½
				Kenmare R., Bal-			
				lycrovane }	3 42	10½	7½
				" Dunkerron -	3 45	10½	8
				" Ormond -	3 43	10	7½
				" West Cove -	3 52	10	7½
				Ballinskellig Bay -	3 40	12	7½

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	N
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	
Valentia Harbour -	3 42	11	8	Trawbreaga Lough	6 10	11½	
Ventry -	3 44	10½	7½	Slievebane Bay -	5 49	10½	
Blasket Islands -	3 30	11½	8	Culdaff Bay -	5 53	8½	
Dingle -	3 51	10½	7½	Warrenpoint -			
Smerwick -	3 50	11½	8	Lough Foyle - }	6 20	6½	
Tralee Bay (Fenit)	4 3	12½	9½	Moville " -	7 6	7½	
R. Shannon, Kil-				Londonderry -	8 1	7½	
baha - }	4 16	13	9½	Coleraine -	6 24	6½	
" Kilrush -	4 42	14	10½	Port Rush -	6 8	5½	
" Carriga- holt - }	4 44	14	10½	Skerries -	6 15	5	
" Tarbert -	4 57	14½	10½	Ballycastle Bay -	6 25	3	
" Foynes Id.	5 35	15½	12	Red Bay (Pier) -	10 31	4	
" Mellon -	6 1	18½	13½	Cairn lough -	10 51	5½	
" Limerick	6 16	18½	13½	Maiden Rocks	10 43	6½	
Liscannor Bay -	4 23	13½	10	Lough Larne -	10 48	6½	
Mutton Island -	4 20	13½	9½	Belfast -	10 43	9½	
Galway -	4 35	14½	11	Donaghadee -	11 13	11½	
Killeany, Arran Ids.	4 28	13½	11	South Rock -	10 58	13	
Cashla Bay -	4 33	16	12	Lough Strangford }	10 53	14	
Kilkieran Cove -	4 34	15½	11	(Killard Point)			
Greatman Bay -	4 39	15½	11½				
Roundstone -	4 28	13½	10½				
Slyne Head -	4 30	13½	10				
Clifden Bay -	4 30	13½	10				
Ballynakill Bay -	4 40	13½	9½				
Inishbofin -	4 34	12½	9½				
Inishturk -	4 36	12½	9½				
Clare Island -	4 38	13½	9½				
Westport -	4 57	12½	9½				
Achillbeg -	5 14	10½	8				
Bulls Mouth, } (N. entrance of Achill Sound) - }	5 38	10½	7½				
Blacksod Bay }							
(Quay) - }	4 47	10	8½				
Broadhaven Harb.	5 0	10½	7½				
Killala Bay -	5 22	10½	8				
Sligo Bay -	5 18	11½	8½				
Ballysadare (Quay)	6 0	8½	5½				
Sligo Harbour }							
(Oyster Island)	5 23	11½	8½				
Ballyshannon (Bar)	5 18	11½	8½				
Donegal Harbour }							
(Salthill Quay)	5 18	11½	8½				
Teelin Harbour -	5 16	11½	8½				
Killybegs -	5 16	11½	8½				
Lough Rossmore -	5 20	11	8				
Rutland Island -	5 22	11	8				
Gweedore (Banbeg)	5 32	11	8				
<i>Ireland, North and East Coasts.</i>							
Ballyness (Bar) -	5 22	11½	8½				
Sheephaven -	5 32	11½	8½				
Mulroy Bay, (Bar)	5 40	11½	8½				
" Fanny Hole -	6 17	9½	8				
" Seamount Bay	6 44	7½					
" Cranford Bay	8 3	4	2½				
Rathmullan, Lough }							
Swilly - }	5 42	12½	9				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Bessin -	8 57	20	15 $\frac{1}{2}$	Elbe, Hamburg -	5 29	6 $\frac{1}{2}$	
les -	9 7	20	15 $\frac{1}{2}$	Eider, Tønning -	2 1	9	
m -	9 38	21	16	" Friederich- stadt -	2 37	9	
-	9 36	21	17 $\frac{1}{4}$	Eider, Rendsborg -	7 42	4	
-	9 39	21	16	Husum -	2 36	9	
-	9 29	23 $\frac{1}{2}$	18	List -	2 21	6	
uf -	10 6	9 $\frac{1}{2}$	7 $\frac{1}{2}$	Hierting -	2 45	5	
-	10 57			Nyminde Gab -	2 41	2	
-	9 51	22	18	Thorsminde -	3 34	2	
-	2 28			Blaavand or Horn Point -	1 44	5	
-	10 44	23 $\frac{1}{2}$	18	Aggerminde -	4 9	2	
y-en-Caux -	10 46	27	21 $\frac{1}{2}$	Hirtshals -	4 28	1	
-	11 6	27	20 $\frac{1}{2}$	Skagen or the Skaw	5 56	1	
-	11 9	27	21	Bergen -	1 30	4	
-	11 5	27 $\frac{1}{2}$	21	Romdals Islands -	10 45	6	
-	11 26	27 $\frac{1}{2}$	21	Ramso Fiord -	10 45	7	
lery-sur- e. -	11 46	27	21 $\frac{1}{2}$	Oxbaasheia -	12 0	8	
-	11 25	25	19 $\frac{1}{2}$	Træ Islands -	11 45	7	
isnez -	11 27	21 $\frac{1}{2}$	16 $\frac{3}{4}$	Værø -	12 0	9	7 $\frac{1}{2}$
-	11 49	19 $\frac{1}{2}$	15 $\frac{1}{2}$	Lofoten Islands -	12 0	9	7 $\frac{1}{2}$
es -	12 0	19	15	Tromsø -	1 45	8	
ue -	12 8	16 $\frac{3}{4}$	13 $\frac{1}{2}$	Hammerfest -	1 10	9	
<i>North Sea, East Coast.</i>				<i>Færoe Islands.</i>			
-	12 18	16	13	Fugløe Fiord -	11 15	6 $\frac{1}{2}$	4 $\frac{1}{2}$
-	12 25	19	15	Svinøe Fiord -	12 0	6 $\frac{1}{2}$	4 $\frac{1}{2}$
berg -	12 48	13	11	Leervig Fiord -	0 30	6 $\frac{1}{2}$	4 $\frac{1}{2}$
-	3 15	15		Miaveness -	3 12	6 $\frac{1}{2}$	4 $\frac{1}{2}$
-	1 20	15		Naalsøe Fiord -	4 0	6 $\frac{1}{2}$	4 $\frac{1}{2}$
-	4 25	15		Skaapen Fiord (be- tween Stormøe and Sandøe) -	5 0	9 $\frac{1}{2}$	7 $\frac{1}{2}$
-	1 20	15		" (be- tween Hestøe and Sandøe) -	5 30	9 $\frac{1}{2}$	7 $\frac{1}{2}$
apot -	12 30	12	8	Waagøe Fiord -	6 0	9 $\frac{1}{2}$	7 $\frac{1}{2}$
-	2 0	11	9	Westmanshaven -	8 0	9 $\frac{1}{2}$	7 $\frac{1}{2}$
shaven -	2 15	10	8	Suderoe Fiord -	6 0	9 $\frac{1}{2}$	7 $\frac{1}{2}$
West Gat) -	1 45	7		Myggenæs Fiord -	9 0	9 $\frac{1}{2}$	7 $\frac{1}{2}$
tsluis -	2 30	8	6	Eides Fiord -	11 0	9 $\frac{1}{2}$	7 $\frac{1}{2}$
-	3 0	5		<i>Iceland.</i>			
m -	3 45	7		Reikiavik -	5 0	17 $\frac{1}{2}$	13 $\frac{1}{2}$
-	2 30	5		<i>Lapland.</i>			
tside shoals) -	6 30	4	3 $\frac{1}{2}$	Liza Bay -	5 58	9	
-	7 0	12		Nova Zembla Harb. -	6 36	10	
liep -	7 27	4	3 $\frac{1}{2}$	Jekatarina Islands -	6 23	10	
ling (West) -	8 40	6	5	Kildin Island -	6 45	12	
l Gat -	9 0	7		Habitable Island, } Seleney Bay -	7 9	9	
ollum Rd. -	11 30	7		Teriberka River -	7 20	12	
ter buoy) -	10 0	8-10		Olenji Islands -	7 30	12	
(road) -	10 30	8-10		Charlowka River -	8 8	12	
-	11 15	8-10		Seven Islands -	8 20	12	
-	12 0			Jukan Islands -	9 0	13	
ey -	10 30	8		Sviatoi Nos -	9 15	14	
ater light } -	11 30						
Oog -	12 0	9 $\frac{1}{2}$					
id -	11 33	9 $\frac{1}{2}$	7				
trance -	12 0	11					
ixhaven -	1 8	10					
ansbutt -	1 58	9					
uckstadt -	3 9	10					
tona -	5 19	7					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
White Sea.							
	h. m.	ft.	ft.		h. m.	ft.	ft.
Inkanskie -	9 15	14		Walvisch Bay -	1 54	6	
Turna Bay -	9 54	11		Port Alexander -	3 0	5	
Trek Island -	10 48	20		Great Fish Bay -	2 30	5-6?	
Litke Bank -	11 45	15		Little Fish Bay -	2 30		
Cape Kanushin -	11 54	15		Lobito Bay -	2 20	5	
Sosnovets -	11 44	18		Benguela -	2 30	5?	
Morjovets I. -	11 20	17		St. Helena Island -	3 11	3	
Cape Voronov -	11 20	17		Ascension Island -	5 30	2	
Intsi Point -	11 55	16		San Paul de Loanda -	4 30	5	
Koulou River -	1 15	20		River Congo -	4 30	6	
Mezen -	1 48	15-22		Mayumba -		7	
Kerets Point, Gulf of Arkhangel -	4 30	5½		River Gaboon -	5 30	3	
Nikolskoi Tower -	6 0	2		Cape Lopez -	4 30	4-6?	
Moudinga I. -	5 50	3½		Corisco Bay -	5 0	7	
Dvina Bar -		3½		(Elobey Isles) -			
Arkhangel -	7 28	2½		Anno Bom Id. -	3 45	5	
Nikolskoi Chan. -	5 25	3		St. Thomas Id. -	3 25	4½	
Gribanika Pt. -	4 50	3		Princes Id. -	3 45	4½	
Jijginak I. -	5 15	4		Fernando Po -	4 0	7	
Cape Orlov Letni, Gulf of Onega -	5 18	4		Cameroon River -	4 0?	6	
Onega River -	9 17	6-7		Bonny and New Calabar Rivers -	5 0	9	
Souma -	6 30	5½		Brass River -	4 0	6	
Solovet Road -	5 0	4		River Niger, Nun (entrance) -	4 8	6	
Kyem River -	5 23	4		" Benin -	4 30	7	
Kalgalaksha -	6 50	7		" Middleton -	4 15	5	
Keret, Gulf of Kandalak -	3 8	6		" Pennington -	4 15	5	
Kovda Bay -	3 25	6		" Dodo -	4 17	5	
Kandalaksha -	3 25	7		" Ramos -	4 20	5	
Sosnovaia Bay -	2 40	6		" Forcados -	4 22	5	
Kou Zomen -	3 30	6		" Lagos (Bar) -	6 0	3	
Tetrina -	3 17	7		" " Consulate Wharf -		2	
Nova Zembla.				" Palaver Ids. -		1	
Hakluyt Head -	1 30	4		Cape Coast Castle -	4 30	6	
Spitzbergen.				St. George d'Elmina -	4 30	6	
Bell Sound -	8 56	3½		Cape Three Points -	4 0	4	
Africa, West Coast.				Axim -	4 30	4	
(From Cape of Good Hope to the Northward.)				Grand Lahou -	4 20	4	
Simons Bay -	2 44	5½	3½	Tabou River -	4 45	3-4	
Hout Bay -	2 20	5		Cape Palmas -	4 30	4	
Table Bay -	2 40	5		Sinou -	5 0	4	
Saldanha Bay -	2 0	6		Sangwin River -	5 15	4	
St. Helena Bay -	2 30			Grand Cestos -	5 20	4	
Roodewall Bay -	2 30	6½		Edina -	5 50	4	
Hondenklip Bay -	2 30	5½		Junk River -	5 45	5	
Mc. Dougall Harb. -	2 30	5½		Monrovia -	6 0	6	
Port Nolloth -	2 30	5½		Gallinas River -	6 45	4	
Elizabeth Bay -		5-6		Gilmorris Id. -	6 0	11	
Angra Pequena -	2 30	8		Sherbro River -			
Ichabo Island -	1 0	6	4	Edmonstone Id. -		8	
Spencer Bay -	10 50	5-6		Bagroo River -		11	
Port d' Ilheo -	3 0	8-10		Banana Islands -	8 15	9	
				Sierra Leone -	7 55	8	
				Yellaboi Island -	7 10	10	
				Scarcies Rivers -	7 10	10	
				Mellacoree R. -	7 40	11	
				Forecarreah R. -	7 40	11	
				Mahneah R. -	7 40	11	
				Isles de Los -	6 35	13	



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
Cape Peñas -	6 42	12		Port Belgrano -	6 0	12	1
Cape San Diego -	4 30	10		Tristan d'Acunha -		8	
Orange Bay -	3 30	6		* RiodelaPlata, (C. Castillos) }	8 30	2	
Goree Road -	4 0	8		" Buenos Ayres	12 0	3-5	
Le Maire Strait -	4 0	7		" Barragan Bay	7 0	5-9	
Staten Island -	4 30	8		Rio Grande do Sul		1½-2	
San Sebastian Bay	7 0			Santa Catharina L.	2 30	3	
<i>Falkland Islands, East Falkland.</i>				San Sebastian -	2 0	4	
Berkeley Sound -	5 0	7		Ilha Grande -	12 30	5	4
Port William -	5 15	7	5½	Rio Janeiro -	3 0	4	3
Port FitzRoy -	4 45	6		Porto Frio -	2 40	4½	
Port Pleasant -	5 0	6½		Macahé -	2 30	9½	
Island Harbour, } Choiseul Sound	5 20	6		Benevente -	3 0	5	
Mare Harbour -	6 0	6		Espirito Santa Bay, and Port Victoria }	3 0	4	
Darwin Harbour -	6 30	5½		Abrolhos -	4 48	6	
Walker Creek -	6 20	5½		Martin Vas Rocks	3 45		
Low Bay -	5 0	5½		Os Ilheos -	4 30		
Adventure Sound	5 30	5½		Bahia -	3 30	8	
Bay of Harbours -	6 0	5		Maceio -	4 30	8½	
Falkland SoundN } entrance	6 45			Pernambuco -	4 45	8	6
" S. entrance	7 0			Parahayba -	5 0	9-12	
Ruggles Bay -	7 30	5		Cape St. Roque -		8-10	
Port King -	7 30	5		As Rocas -	5 15	10	
" Sussex -	8 15	6		Fernando Noronha	4 0	6	
" San Salvador	8 10	8		Aracati -	6 0	8	
" San Carlos -	7 0	8		Jericoacoara -	11 30	12	6
<i>West Falkland.</i>				Maranhã -	7 0	17½	
Port Stephens -	7 45	7½		San Joao -	6 24	14	
" Albemarle -	7 15	7		Para -	12 0	11	10½
" Edgar -	7 15	6		Cayenne River -	3 45	6-11	
Fox Bay -	7 0	6		Maroni River -	5 30	8	
Manybranch Harb.	7 40	7½		Surinam -	6 0	5½	
Port Egmont -	7 30	11		Corentyn River -	5 10	8½	6
Hope Harbour -	8 10	7		Berbice -	4 30	11½	6
Shallow Harbour -	9 30	6		Demerara River -	4 45	9	6
ShipHarbour, New Island }	10 30			Orinoco R. (entr.)	6 0	3	
<i>South America, East Coast—continued.</i>				Chacachacare Id., Trinidad }	3 30	4	
Coy Inlet -	9 30	40		Dragons Mouth "	3 0	4	
Port Gallegos -	8 50	46		Port Spain "	4 30	4	3
Santa Cruz River -	9 30	40	29	Tobago -	irr.	3½	
Port San Julian -	10 45	30		Cartagena -	11 0	1½	1
" Desire -	12 10	18½		Caledonia Harbour	11 40	1½	1
" Melo -	3 40	15		<i>Caribbean Sea and the Bahamas.</i>			
" Santa Elena	4 0	17		Barbados -	irr.	2	
Nuevo Gulf -	7 0	10		Grenadines -	3 0	1½	1
Port San Josef -	10 0	30	25	Grenada, (St. George Harb.) }	2 40	1½	1
Sea Bear Bay -	12 45	20		English Harbour, Antigua }		2	
Port San Antonio -	10 40	28		Anegada -	9 0	1½	
Rio Negro -	11 0	14		Gorda Sound, Virgin Island }	8 30	1½	
San Blas -	2 0	12	10	Tortola -	8 30	1½	
Colorado River -	4 0	9	7½	Culebra or Pass-age Island }	9 0	1	
Union Bay -	3 10	12	9				

\* In the Rio de la Plata the rise is greatly influenced by the winds, the water being raised by S.E. w and depressed by those from N.W., causing at Buenos Ayres a difference sometimes of 12 feet.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Instad, } -	7 30	3		Colombilla Cay, }	2 0	2	
Cruz - }				Pearl Cays - }			
an, Porto }	8 2	1½		Cape Gracias Harb.	10 30	2	
- - }	6 45			Royal Harbour, }	7 45	3½	
- - }	8 0	3½	2½	Ruatan - }	irr.	2	
r-vos - }	9 30	3	2½	Serranilla Bank -	irr.	2	
Cays - }	7 0	4		Serrana Bank -	irr.	1	
l Island - }	7 0	2½		Old Providence -	irr.	1	
- - }	7 20	2½		Bonacca Island -	9 0	1½	
sland - }	7 45	3½		Mugeres Harbour -	9 30	1½	
eHarbour, }	8 30	4	3½	Cozumel -	8 30	1½	
Island - }	8 0	3		Cape Catoche -	9 30	1½	
s Reef - }	7 40	3		Campeche -	1 45	2½	2
ay - }	7 40	3		Sisal -		2	
os Kay - }	7 40	3		Laguna de Terminos	noon	1½	
New Pro- }	7 30	4	3	Triangles -	noon	1½	
ce - }	7 30	4		Arcas Rocks -	noon	1½	
lay " - }	7 30	4		Vera Cruz -		2	
y Anchorage	8 15	4	3	<i>United States.</i>			
r Sound -	8 15	4	3	<i>(Texas, Louisiana, Mississippi, Florida, Georgia,</i>			
s Road -	8 30	4	2½	<i>and S. &amp; N. Carolina.)</i>			
- - }	8 0	3		Brazos R. (entr.)*	irr.	1½	
War Cay -	8 10	4		St. Luis Pass, Texas*		1½	3
y - }	8 30	3		Galveston -		1½	4
r Rock -	7 50	3		Sabine Pass*		1½	
ay - }	7 0	4½		Calcasieu River*		2½	1½
de la Plata, }	7 30	3?		Vermilion Bay -	irr.	2½	1½
omingo - }				(entrance)*			
ille Bay -	7 0	4-5?		Atchafalaya Bay*	irr.	2-2½	
uphin -	7 0	5½	3½	Timballier Bay*	irr.	2	
Haiti, St. }	6 0	3		Barataria Bay -	irr.	1½	
ingo - }				(entrance)*			
Harb. - }	6 0?	3?		Mississippi S.W. pass		1½	3
es Bay - }	8 0?	1?		Biloxi* -	irr.	2	4
St. Mark - }	8 0?	1?		Mobile -	irr.	1-2	
Prince - }	8 0?	1?		Pensacola -		1½	
s - }	8 0?	1?		St. Andrews Bay*	irr.	1-2	
Aux Cayes, }	uncertain	2-3?		St. Georges Sound }	irr.	2½-4	
d Bay - }		2-3?		(west entrance)*			
is Bay - }		2-3?		(middle entr.)*	1 31	1½	1½
Bay - }		2-3?		Apalachicola Bay -		2½-4	
- - }		2-3?		St. Marks* -	1 14	3	2½
Cuba - }		3		Cedar Cays* -	0 51	3½	2½
Antonio, }		1½		Tampa Bay* -	11 21	1½	1½
- - }				Tortugas* -	9 56	1½	1
oyal, Ja- }	11 0	1		Cay West* -	9 30	1½	1½
- - }				Cay West, N.W. }			
<i>Bermudas.</i>				Channel* - }	9 10	1½	1½
Id. Dock }	7 14	4		Sand Cay* -	8 40	2	1
- - }				Indian Cay* -	8 23	2½	1½
<i>America, East Coast. (Isthmus of Panama</i>				Cape Florida* -	8 34	1½	1½
<i>to the Northward.)</i>				St. Augustine* -	8 21	5	4
wn - }	9 0	1½		St. Johns River* -	7 28	5½	5
lds - }	1 50	2		Fort Clinch, Fer-	7 53	6½	6½
lands - }	1 45	2		mandina* - }			
				St. Simons Island*	7 43	8½	6½
				Doboy Lighthouse*	7 33	7½	7
				Savannah (City)* -	8 13	7½	6½

the United States Coast Survey, the times of High Water being the Corrected and not the Vulgar Establishment.

Place.	High Water Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Fort Pulaski, Savannah (entr.)*	7 20	8	7	Little Gull Island*	9 38	3	
Hilton Head*	7 19	7½	6½	New London*	9 28	3	
St. Helena Sound*	7 8	7½	6	New Haven*	11 16	6½	
North Edisto R.*	7 10	7	5½	Bridgeport*	11 11	8	
Charleston*	7 26	6	5	Sheffield Island*	10 58	8½	
Bulls Island Bay	7 16	5½	4½	Oyster Bay*	11 7	9½	
Georgetown*	8 40	4½	3½	Sands Point*	11 13	9	
— South }	7 56	4½	3½	New Rochelle*	11 22	8½	
Island*	-	-	-	Throgs Point*	11 20	9½	
Wilmington*	9 6	3	2½				
Cape Fear River (Smithville)*	7 19	5½	4½	(New York to Portland.)			
Bald Head*	7 26	5	4½	Tarrytown*	9 57	4	
Beaufort*	7 26	3½	2½	New York*	8 13	5½	
Ocracoke Inlet*	7 4	2½	2	Sandy Hook*	7 29	5½	
Hatteras Inlet*	7 4	2½	2	Hell Gate Approaches* :			
(Chesapeake Bay and Rivers.)				— Long Island (Blackwells Dk.)*	9 59	6	
Cape Henry	7 40	4		— N. of Astoria Ferry*	9 48	6½	
Cape Charles	7 45	5		— Pot Cove, (S.E. part)*	10 48	8½	
Old Point Comfort*	8 17	3	2½	— Wards Island (Paupers Dock)*	10 9	6½	
James R., City Point*	2 11	3	2½	Montauk Point*	8 20	2½	
Richmond*	4 28	3½	2½	Block Island*	7 36	3½	
York R. (Moody's Wharf)	9 35	3½		Point Judith*	7 32	3½	
Piaukatan River (Cherry Point)	10 5	2	¾	Newport*	7 45	4½	
Tappahannock*	0 42	2	1½	New Bedford, entrance*	7 57	4½	
Rappahannock (Saunders Wharf)	3 2	2½	2	Bird Island Light*	7 59	5½	
Point Lookout*	12 58	2	1½	Kettle Cove*	7 48	5	
Annapolis*	4 38	1	1	Cuttyhunk*	7 40	4½	
Chester R. (Rock-hall Creek)*	5 23	2½	1	Quicks Hole (S. Side)*	7 36	3½	
Patapsco River (Bodkin Point)*	5 42	1½	1	" (N. Side)*	7 31	4½	
Baltimore*	6 33	1½	1½	Menemsha Bight*	7 45	4	
(Delaware Bay and River.)				Woods Hole (entr. from Vineyard Sound)*	8 34	2	
Cape Henlopen	8 0	4½		— (entrance from Buzzard Bay)*	7 59	4½	
Delaware Breakwater*	8 0	4½	3½	Tarpaulin Cove*	8 4	2½	
Higbees, Cape May*	8 33	6½	5½	Gay Head	7 37	7	
Egg Island Light*	9 4	7	5½	Holmes Hole*	11 43	1½	
Mahons River*	9 52	7	5½	Edgartown*	12 16	2½	
New Castle*	11 53	7	6½	Hyannis*	12 22	4	
Philadelphia*	1 18	6½	5½	Nantucket*	12 24	3½	
(New Jersey.)				St. George Shoals	10 30	7	
Cape May Landing*	8 19	6	5	Monomoy*	11 58	5½	
Cold Spring Inlet*	7 32	5½	4½	Provincetown*	11 22	10½	
Little Egg Harbour	7 10	4½	3½	Wellfleet*	11 5	13½	
(Long Island Sound.)				Cape Cod	11 30	13	
Watch Hill*	9 0	3	2½	Barnstable	11 22	10	
Stonington*	9 7	3½	3	Plymouth*	11 19	11½	
				Boston Light*	11 12	11	
				Boston (Charles-town Naval Yd.)*	11 27	11½	
				Marblehead	11 30	12	

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Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
n*	11 13	10½	8	St. John Harbour	11 21	27	23
cesterHarbour*	11 4	10½	8½	Quaco -	11 35	30	25
port* -	10 57	10½	8	SpicersCove (near	11 35	37	30½
squam* -	11 0	10½	9	Cape Chignecto }	11 47	41	34½
ich* -	11 26	10½	8½	Grindstone Island -	11 49	45	38
buryport* -	11 22	9	7½	Folly Point }	11 55	45½	38
mouth* -	11 23	10	8½	(mouth of Petit-	12 15	47	37½
and* -	11 25	10	8½	coudiac River - }			
iebec River }				CumberlandBasin, }			
anniwells }	11 15	9½	8	(Sackville - }			
int)* -				Monckton(Railway)			
at Desert Id. -	11 10	13					
<i>Bay of Fundy, Nova Scotia.</i>				<i>Nova Scotia.</i>			
Sable, Bar-				Negro Harbour -	8 12	7	5½
gton Bay, }	8 27	8½	6½	Shelburne -	8 4	7	5½
lam Point) - }				Rugged Island -	7 59	7½	6
Sable,Clarke }	8 58	11	9	Port Mouton -	7 54	7½	5½
rbour - }				Liverpool Bay -	7 50	8	5
ico -	9 25	12	10	Port Metway -	7 50	8	5
le, (Jones }	9 27	12½	10½	Cape le Have }	7 48	7	5½
chorage) - }				(Spectacle Id.) }			
Island (Cape }	9 49	12½	10½	Le Have, Crooked }	7 51	7½	6
ble) - }				Channel }			
woods An- }	9 54	13	10½	„ Mothers Island	7 51	7	5½
orage - }				„ Getsons Cove	7 55	7½	6
ue -	10 4	15	11½	„ Bridgewater, }	8 6	8	6½
outh -	10 9	16	13	McKean's Wharf }			
y Cove E., }	10 33	21½	17½	„ Lunenburg }	7 54	7½	6
Marys Bay }				(Spidlers Cove) }			
Passage -	10 41	22	18	Sable Island, N. side	7 30	4	
i Passage -	10 43	20½	17	„ S. side	6 30	4	
f Cove, West	10 47	23	19	Halifax Harbour -	7 49	6	5
y Gut -	11 0	27½	23	Jedore Harbour -	7 45	6½	4½
George -	11 17	32	28	Ship Harbour -	7 54	6½	4½
laute -	11 21	33	28½	Sheet Harbour -	8 6	6½	4½
Rock -	11 29	36	31	Liscomb Harbour -	8 0	6½	4½
ersAnchorage	11 42	39	33	Beaver Harbour	7 40	6½	4½
oro, Basin }				Whitehaven -	8 0	6½	4½
of Mines }	12 17	43	37½	Canso Harbour -	7 48	6½	4½
n Bluff „ -	12 30	48	40	Crow Harbour -	8 0	6½	4½
„ -	12 41	50½	43½	Guysborough -	8 20	6½	4½
<i>Bay of Fundy, New Brunswick.</i>				Pomquet -	9 15	4	2½
love, Grand }	10 54	20	15	Cape George -	9 15	4	2
nan - }				Merigomish -	10 6	5½	3½
as, Seal Is- }	11 5	18	14½	Pictou Harbour -	10 0	6	4
l „ - }				Caribou Harbour -	10 0	6	4
l Harbour, }	11 7	21	17½	Amet Sound -	10 30	8	5
nd Manan - }				Tatamagouche -	10 0	8	5
Quoddy -	11 12	21	17	Wallace Harbour -	10 30	8	5
lead, Grand }	11 16	22½	18½	Pugwash Harbour	10 30	7	4
nan - }				Bay Verte -	10 0	9	5
au -	11 18	24½	21	<i>New Brunswick.</i>			
ig Harbour -	11 19	23½	20	Jourimain Island -	9 30	6	3
obello }				Shediac Harbour -	{ 1 0 }	4	2
elchpool) - }	11 21	23½	20		{ 8 0 }		

in the United States Coast Survey, the time of High Water being the Corrected and not the Vulgar Establishment.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Prince Edward Island.</i>				<i>Anticosti Island</i>			
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	
East Point -	8 30	3½	2	(East Cape) -	1 0	5	
Cardigan Bay -	8 40	5	3½	„ Bear Bay -	1 10	5	
Cape Bear -	9 0	6	3	„ West Point -	2 0	6	
Charlottetown -	10 45	9½	7	Cawee Islands -	1 50	9	
Crapaud -	10 0	8	6	Egg Island -	2 0	11	
Bedeque Harbour -	10 15	7	5	Point de Monts -	12 0	12	
Minimegash -	3 30	5	3	Cape Chatte -	12 0	13	
Egmont Bay -	3 0	4	2	Godbout River -	1 52	11	
Cascumpeque Hr. -	5 40	3	2	St. Nicholas Harb. -	1 55	12	
Richmond Harb. -	6 0	3	2	Manicouagou River -	2 15	12	
Cape Turner -	6 10	4	2	Bersimis River -	2 0	12	
Grand Rustico -	6 40	4	2	Bic Island -	2 15	14	
Tracadie -	7 0	3½	2	Port Neuf -	2 10	13	
St. Peter Harbour -	8 30	4	2½	Matan River -	2 15	11	
Boughton Harb. -	8 40	5	2½	Little Metis -	2 10	13	
				Saguenay, Tadousac -	2 45	17	
				„ Chicoutimi -	4 11	12	
<i>Cape Breton Island.</i>				<i>River St. Lawrence.</i>			
Port Hood -	9 0	4½	2	Green Island -	2 45	16	
Gut of Canso } (Plaister Cove) }	9 15	4	2	Brandy Pots -	3 0	17	
Mabou River -	9 0	4		Coudres Island -			
Chetican -	8 15	3½		(Prairie Bay) -	4 25	17	
Cape North -	8 0	4		Pillars -	5 0	17	
St. Anne Bay -	8 34	6	4½	Crane Island, -			
Sydney Harbour -	8 15	5	4	Middle Traverse }	5 24	17	
Menadou Bay -	8 15	5½		Orleans Island, }	5 40	17	
Louisburg Harb. -	8 0	5	4	North Traverse }			
St. Peter Bay -	7 30	6	4	Quebec -	6 38	18	
Habitants Harbour -	8 20	6½	4½	Carouge River -	7 15	16	
Arichat -	8 10	5	4	Frechette Island -	8 0	14	
Bear Head -	8 30	4½	3	Port Neuf -	8 30	14	
Poulament Bay, }				Grondine -	9 0	9	
Madame Island - }	7 50	6	4	Cape Roche -	9 30	6	
Grande-digue, „ -	7 55	6½	4½	Champlain -	9 45	3	
				Batiscan -	9 48	3½	
				Antigonish Harb. -	9 0	4	
				Three Rivers -	11 30	1	
<i>Labrador and Gulf St. Lawrence.</i>				<i>Gulf St. Lawrence.</i>			
St. Lewis Cape -	6 30			St. Paul Id. -	8 0	5	
Fall Harbour } (Telegraph Pt.) }	6 40	3½		Magdalen Islands -	8 20	3	
Chateau Bay -	7 35	3½	1	Gaspé Basin -	2 40	5	
Red Bay -	7 45	3½	1½	Point Macquereau -	2 0	5	
Bradore Bay -	8 45	4	2	Carleton Point -	3 0	6	
Belles Amour Bay -	9 0	4½	2½	Dalhousie Harb. -	3 10	9	
Bonne Esperance } Harb. - }	9 15	5	2½	Campbell Town, }			
Mistanoque -	10 30	6	3	Ristegouche R. }	4 0	10	
Antrobus Island -	10 30	5	3	Bathurst -	3 15	7	
Wapitagan Harbour -	10 30	5	3	Shippigan -	3 42	5½	
Coacocho Bay -	10 30	5	3	Carquette Harbour -	2 40	6	
Kegashka Bay -	10 45	5	3	Miscou -	2 30	5	
Little Natashquan -	11 0	5	3	Miramichi Bar -	5 30	5	
Appetetat Bay -	11 10	5?	3?	Sheldrake Island -	6 0	5	
Betcheween Har- } bour - }	11 32	5	3	Vin Harbour -	5 45	5	
Clearwater Point -	11 30	5	3	Beaubère Island -	6 30	6	
Mingan Harbour -	1 16	6	4	Point Escumeneac -	4 10	4	
Mingan Island -	1 30	6	4	Richibucto River -	3 30	4	
Bay of Seven Is- } lands - }	1 40	9	5	Buctouche River -	7 0?	4?	
				Cocagne River -	7 30?	4?	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Newfoundland.</i>				<i>Barrow Strait.</i>			
Frederic -	h. m. 8 33	ft. 6½	ft. 4½	Port Leopold -	h. m. 12 6	ft. 6	ft. 4½
St. John's Harbour -	9 15	8½		Erebus Bay -	12 6	8	
and Little -	8 15	7	4	Griffith Island -	12 15	3½	2½
St. Lawrence Harbour -	8 30	7	4	<i>Melville Island.</i>			
Harbour -	8 45	6½	4½	Winter Harbour -	1 30		
St. John's Harbour -	7 40	7½	5	<i>Banks Land.</i>			
Harbour -	8 0	7½	5	Bay of Mercy -		2	
St. Mary -	8 30	7	5	Prince of Wales Strait -		3	
St. John's -	8 30	7	5	<i>Africa, South Coast.</i>			
St. John's Harbour -	7 0	6½	5	Simons Bay -	2 44	5½	3½
St. John's -	7 30	6	4	Dyer Island -	2 50	5	
St. John's -	7 30?	7?		Cape Agulhas -	2 50	5	
St. John's -	7 22	3½	2	Mossel Bay -	3 30	6	
St. John's -	7 0	6	4	Nyana Harbour -	3 45	5	
St. John's -	7 10?	5?		Plettenberg Bay -	3 10	6	
St. John's -	7 20	4		Flesh Bay or Bay -			
St. John's -	7 0?	2-3?		St. Bras -	3 30?	6?	
St. John's -	7 0?	2-4?		Algoa Bay -	4 0	4-5	
St. John's -	7 0?	2-4?		Bird Islands -	4 0	4-5	
St. John's -	7 15	2-4		Waterloo Bay -	4 0	6	
St. John's -	7 0?	2-4?		Buffalo River (entrance) -	3 45	4½	
St. John's -	6 30?	4?		St. John River -	4 0	5	
St. John's -	7 21 A.M.	4½	3	Port Natal -	4 30	6	
St. John's -	6 30 P.M.	4½		Delagoa Bay, English River (Portuguese Factory) -	5 20	12	
St. John's -	7 0?	2-3?		" (Port Melville) -	4 30	15	
St. John's -	7 0?	2-3?		" Shefeen Island -	4 40	12	
St. John's -	7 0?	2-3?		<i>Africa, East Coast.</i>			
St. John's -	7 23	2½		Inhambane River -	4 15	10	
St. John's -	7 25	3?		Cape Bazaruto -	4 15	10	
St. John's -	10 47	5		Sofala River -	4 0	19	
St. John's -	10 42	5½		Quilimane River (entrance) -	4 15	16	
St. John's -	9 15	6	4	Zambezi River (Pearl Island) -	4 30	12-15	
St. John's -	8 55	5½	3½	Luabo River (entrance) -		22	
St. John's -	9 0	6	4	Angoxa River -		13	
<i>Hudson Strait.</i>				Mozambique Harbour -	4 15	12	
Islands -	6 50			Pomba Bay -	4 0	15	11
and Hecla -	7 0	8		Oibo Harbour -	4 15	6	
St. Melville -				Mahato Island -	4 30	7	
Isula -				Cape Delgado -	4 0	16	11½
<i>Hudson Bay.</i>				Rovuma River -	4 0	16	11½
factory -	11 15	10-14		Lindy River (entrance) -	4 15	12	
<i>Arctic Regions, Greenland, West Coast.</i>				Mungullo or Mongallo River -	4 45	12	
Isaahab -	5 6	7	5				
Isaahab -	6 3	12½	9½				
Isaahab -	6 30	10					
Isaahab -	11 0	8					
Isaahab -	11 8	7½					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	
	h. m.	ft.	ft.				
Quiloa -	4 45	12					
Latham Island -	4 0	10					
Zanzibar (Channel)	4 15	11					
Zanzibar -	4 20	10					
Pemba Channel -	4 0	11					
Port Cockburn, } Pemba Id. - }	4 15	12					
Melinda -	4 0	11					
Mombaza -	4 15	11					
Lamo Harbour -	4 6	11					
Patta Bay -	4 30	10					
Port Durnford -	4 45	12					
Brava -	4 30	8					
Magadoxa -	4 30	8					
Rás Haffún -	6 15	4					
Bander Alúleh -	6 45	6					
Bander Gorí -	8 45						
Berbereh or } Burburra (Gulf } of Aden) - }	7 15	9					
Zeyla -	7 15	8½					
Ghubbet Ne, Socotra	7 0	7					
Gollonsir -	7 20	8					
Bander Sháab -	7 0	7					
Abd-al-Kuri -	8 30	6					
Kal Farun -	8 20	6					
<i>Madagascar, East Coast.</i>							
British Sound -	4 0	9½					
Port Leven -	3 30	7½					
Andrava Bay -	3 30	7					
Antongil Bay } (Port Choiseul) }	4 0	5					
Tangtang Harbour	4 30	6					
Madame Island, St. }	4 0	5					
Mary Harbour - }							
Tamatave -	4 18	8					
Fort Dauphin -	4 30	7					
<i>Madagascar, West Coast.</i>							
St. Augustine Bay	4 30	13					
Noss or Sandy Id.	5 0	15					
Cape St. Vincent -	4 45	12					
Mourondava -	4 45	12					
Barren Islands -	4 45	12					
Boteler River -	4 30?	15?					
Boyanna Bay -	4 30	15					
Makumba River -	4 45	17					
Bembatooka Bay -	4 30	16					
Majambo Bay -	4 30	16					
Narrinda Bay -	4 30	15					
Port Mazambo -	4 30	15					
Port Radama -	4 40	13					
Passandava Bay -	5 0	15					
Dalrymple Bay -	5 0	15					
Minow Islands -	5 0	15					
St. Juan de Nova -		5					
				<i>Red Sea.</i>			
	h. m.	ft.			h. m.	ft.	
				Bab-el-Mandeb St.	12 0	7	
				Mocha Road (East } Coast) - }	12 0	4½	
				Murdounah Island } (East Coast) - }	6 0	3	
				Ushruffi Islands -	6 14	2	
				Massowah -	1 0	3	
				Omaider Island } (Gulf of Akabah) }	6 0	4	
				Rás Mahommed } (Gulf of Akabah) }	6 0	5	
				Jiddah -		3	
				Sale Macowa -	0 30	2	
				Loheia -	1 30	3	
				Suez Bay (head of } Gulf) - }	2 0	6	
				<i>Arabia, S.E. Coast.</i>			
				Bab-el-Mandeb } Strt. (Perim Id.) }	12 0	7	
				Bander Feikam -	10 0	8½	
				Aden & adjacent } Bays - - }	7 30 to } 9 30	7	
				Sughrá -	8 0	6	
				Makátein -	9 0	6	
				Rás-al-'Asidah -	8 30	5½	
				Makalleh -	8 30	7	
				Rás Sharmah -	9 0	8	
				Merbát -	9 0	6½	
				Kuriyán Muriyán } Bay & Islands }	8 20	6½	
				Cape Isolette -	9 0	10	
				Sháb Kadún -	9 20	10	
				Jezírat Hamar-al- } nafur - }	9 30	10	
				Sháb-'bu-saifeh -	9 45	10	
				Ghubbet Hashish -	10 0	10	
				'Om-rasas-Masírah	10 0	10	
				Rás Shébali -	10 0	10	
				Rás-al-Hed -	9 30	9	
				Khór Jerameh -	9 30	10	
				<i>Persian Gulf.*</i>			
				Maskat -	11 15	6	
				Jezírat Jún -	11 30	10	
				Rás al Kheí meh -	11 45	7	
				Al Bida' -	8 30?	6?	
				Bahreín -	5 30	7	
				Jezírat Arabí -	6 30?		
				Jezírat Kabr -		8½	
				Koweit -	0 15	9	
				Basrah (Bar) -	12 0		
				Jezírat Kharg or } Kháreg - - }	8 0	6½	
				Abú-shehr -	7 30	7	

\* Deduced from observations made in the E.I.C. brig Euphrates 1857-58, and H.M. schooner of the Indian Navy, 1858-60, by Commander G. C. Constable and Lieutenant A. W. Stiffe of the Indian Navy.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Nakheî-	7 30?	8?		Calicut Roads -	0 15	5	
-	5 0?			Beypoor River (en-	0 15	5	
ais -	0 45	7½		trance) -			
umb -		8		Cochin Harbour	1 0	3½	
-	12 0?			and Road -			
-	12 0	10					
-	11 0	12		<i>Ceylon, South Coast.</i>			
arek -	10 15			Colombo -	1 0	2	
own -	6 0?	9		Dodandowe Bay -	1 50	1½	
Shoal,}				Pointe de Galle -	2 0	2	
histan -}	9 30	8		Belligam or Red Bay	2 20	2½	
				Kirindi -	3 30		
				Batticalao River -	5 0	2-3	
				Trincomalie Har-	8 18	2	1½
				bour -			
				Palmeira Point -	9 30	7-11	
<i>Hindoostan, West Coast.</i>				<i>Bay of Bengal, West Coast.</i>			
oint (en-	10 30	9½	6	Tuticorin Har-	1 15	2½	1½
Karachi)				bour and Road,			
Bunder}	9 50	7		(Gulf of Mannar)			
of Indus)	10 5	9		Keelacurry -	11 0		
" -	10 10	8		Paumben Pass -	1 30	2	
y " -	9 57	9		Kitnapatnam (West			
iver (en-	10 30	11		side of Palk}	11 0	1½	
er (Mon-	11 40	11		Straits) -			
of Cutch)	12 20	12	8	Negapatam -	5 0	3	
" Creek -	2 0	16	12½	Nagore -	8 15		
se) -	11 0	9		Madras Road -	7 34	3½	
Roads -	11 50	15	11	Pulicat Shoals -	9 25	2½	
	11 35	9	7½	False Point -	8 0	8	
entrance,}	2 15	18	13½	Point Divy -		5	
ambay)	2 0	6		Coringa or Coca-	9 10	4-5	3
-	4 0	19		nada Bay}			
Bar) -	1 30	17		" River (Bar)	9 0	5	
	0 15	16		Balasore River -	10 0	15	
River,}	3 0	18		Kedgerie -	11 30		
River -	2 0	19		Saugor Island -		12	
(entr.)	1 45	18		Western light ves-	10 0	10½	
River, -	1 45	18		sel (entrance to			
ver " -	1 30	17		Hoogly) -			
River " -	1 30	16		Mutlah River,			
Dockyard	11 40	12-17		Western or	9 0	10	
Harbour	11 0	12		Ward's Channel			
River -	2 0	12		(entrance to			
rbour -	2 40	9		" Biddah River)	10 0	14	
nk -	10 30	9		(Muda Kali)	11 45	15	
Harbour -	11 25	9		Calcutta -	2 30		
-	11 30	6					
r Bay* -	10 0			<i>Bay of Bengal, East Coast.</i>			
oint -	10 30	9		Hastings Harbour	10 40	13½	
ver -	11 0	7		(Mergui Archi-			
				pelago) -			
				Mergui -	10 30	18	
				Tavoy River, (en-	10 30	20	
				trance) -			
				Maulmain -	2 0	22	17
				Martaban -	2 20	21	

ides rise, a.m. 6 feet, p.m. 7½ feet from October to March; and the contrary during the rest

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	N
	h. m.	ft.	ft.		h. m.	ft.	
Rangoon R. (entrance)	3 15	21	14	Laccadives, Cher- baniani Reef - }	10 0	7	
Rangoon -	5 30	21	14	Tamareed, Socotra	7 20	8	
Bassein River (entrance) - }	10 0	9	6	Keeling Islands (Port Refuge) - }	5 30	5	
Ramree Road -	10 0	12		Christmas Id. -	10 0		
Kijouk Phyou Harbour - }	10 0	9	6	Nicobar Islands, Nancowry Har- bour - }	9 15	8½	
Akyab, Aracan River (Bar) - }	9 45	9	6	Andaman Islands, Port Blair - }	10 0	9	
Naafe River (entrance) - }	10 0			" Port Corn- wallis - }	10 0	8½	
Cheduba Island -	11 30	8		" Andaman Strait - }	10 24	9½	
Diamond Island -	10 30	8					
Chittagong (Bar) -	1 15	15	10				
<i>Islands in Indian Ocean.</i>				<i>Malacca Strait, Malay Coast.</i>			
Kerguelen (Christ- mas Harbour) - }	2 0	2		Junkseylon Island (East side) - }	10 0	11½	
St. Paul Island -	11 0	3		Queda -	12 0	5½	
Amsterdam Id. -	11 0	3		Penang (George- town) - }	12 0	9	
Mauritius, Port Louis - }	12 30	3	2½	Lt. Vessel (One Fathom Bank) - }	6 0	15	
" Grand Port - }	1 0	1½		Arroa -		10	
Reunion or Bour- bon Island, (St. Pierre) - }	Noon	3½		Cape Rachada -	5 30	13	
" (St. Denis) -	0 22	2½		Sambilangs -		12	
" (St. Gilles) -	1 0	2½		Malacca Road -	7 30	11	
" (St. Paul) -	1 7	4		Off Mount Formosa	8 0	11	
Rodrigue Island -	1 45	6		Tanjong Bolus -	9 30	10½	
Cargados Garayos Shoals - }	2 0	4		North Sands -	5 30	15	
Chagos Archipel- ago, (Diego Garcia) - }	1 30	6		Singapore, New Harbour - }	9 45	10	
Seychelle Archi- pelago, (Mayhé Island) - }	4 0	6½		Rhio -	10 0	7	
Curieuse Island -	5 10	7		<i>Malacca Strait, Sumatra Coast.</i>			
Peros Banhos -	1 30	5		Diamond Point -	12 0	9½	
Amirauté Isles, (St. Joseph I.) - }	5 0	8½		Siak River (en- trance) - }	9 0	12	
Comoro Islands, (Johanna Island) - }	3 30	8½		" off the town -		11	
Comoro Islands, (Mayotta Is- land, N.W. end) - }	4 10	11½		<i>Timor, East End.</i>			
Maldives, Adou Atoll - }	1 0	4		Koepang - - -	11 0	9	
" Suadiva Atoll - }	1 0	4		<i>Sumba or Sandelhout, North Coast.</i>			
Maldives, Adou Matte Atoll - }	3 0	4		Nangamessie Har- bour - - }	11 30	17	
" Male -	12 30	3		Palmedo Road -		15	
" Malcolm Atoll - }	10 30	3		<i>Sumbawa.</i>			
" Heawandou Pholo Atoll - }	9 30	5		Ragged Island -	8 10	3	
				Sapie Bay -	1 0	10	
				Britannia Bay -	1 0	11-12	
				Bima Bay -	Noon	6	



Place.	High Water, Full and Change,	Rise.	
		Springs.	Neaps.
<i>Lombok, West Coast.</i>			
am Bay -	h. m. 8 0	ft. 6	ft.
Bay -		10-12	
<i>Baly.</i>			
Bay } h Coast) -	11 0	9½	
os Road } h Coast) -	5 0	6½	
<i>Java.</i>			
ng Bay -		7-8	
p Harb. } h Coast) -	8 45	3½	
ops Bay } h Coast) -	5 0	5½	4
-		5	
-	10 0	2	
na -	7 0	4	
<i>Sumatra, N.E. Coast.</i>			
or -		5	
be -	6 0	6	
ld., Linga } - }	6 0 P.M.	12	
liver -	4 0	8	
<i>Sumatra, West Coast.</i>			
en -	6 0	3-5	
River (Bar)	6 0	4½	
ur Island } end) - }	6 0	4	
ooly Har- }	6 10	6	
Head -	8 45	8	
<i>Durian Strait.</i>			
sland -		10	
oint -	5 0	10	
und -	5 0	10½	
<i>Banka Strait.</i>			
Ali Point -	{ 8 30 P.M.* 10 0 A.M.† }	12	
a Pass -	irr.	10	7½
Island -	7 0	9¾	
elar -	6 30	12	
Point -	6 30	12	
Point -	8 17†	12¼	
Point -	11 0*	10	
<i>Gaspar Strait.</i>			
endanau -	2 30	4	
at -	2 30	4	

Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.
<i>Java Sea.</i>			
Crimon Islands -	h. m. 8 0	ft. 6	ft. 5
<i>Celebes.</i>			
Macassar -	4 40	5½	
<i>Flores Sea.</i>			
Adenara, Flores -		8	
<i>Moluccas.</i>			
Batchian, Gilolo -	1 0	6	
Sanguir Island -		6	
Gèby, Fohou Island -		5	
Wahaay Harbour, } Ceram - }	6 0	3	
Bouro, Cajeli Bay -	1 0	6	
Amboyna -	0 32	7	
Saparoa Island -		6	
Cambing or Pas- } sage Island - }	noon	6	
Banda, Banda Islands -	4 0	6 ?	
Dampier Strait -		11	
<i>Filipinas.</i>			
Port Zebú -	12 0	7	
Port Buluagan } O'sta Ana - }	12 0	5½	
Port Iliolo -	12 0	5½	
Port San Jacinto, } Ticao Island - }	6 30	6	
Mindanao -	7 0	6	
Manila (Luzon) -	10 40	2½	
Port Sual -		6	
Port Lagnimanoc -	1 30	5½	
Alabat Harbour -	10 0	9	
Paloan Bay (Mindoro) -		5	
Busuanga (Burias Id.) -	12 30	6	
<i>Loo Choo Islands.</i>			
Nafa-Kiang -	6 28	7	
Port Oonting -	6 35	8	
<i>Bonin Islands.</i>			
Port Lloyd -	6 8	3	
New Port, Hills- } borough Id. - }	11 32	3½	
<i>China Sea, East Coast.</i>			
Rendezvous Island, } Borneo, S.W. Coast - }		8	
Tanjong Api -		7	
Sarawak River } (Moratabas entrance) - }	4 0	9	5½

\* In S.E. Monsoon.

† In N.W. Monsoon.

an observations made in the month of September by W. Stanton, Master commanding H.M. Surveying Brig, Saracen.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Sarawak River, } " Santubong } " Sarawak } Junction } " " City } Burong Island - Rajang River - Bruit River - Bintula River - Labuan Island - Mangalaum Island } Bruni River } Dalawan Bay } (Balabac Is- } land) - } Malludu Bay, } Borneo N. Coast } Balambangan Id. - Ragged Point, } Borneo, E. Coast } Pamarung Islands } (Borneo East } Coast) - } Eran Bay (Pala- } wan, West } Coast) - } Tay-bay-oo-bay } " } Ooloogan Bay " } Mayday Bay " } Port Barton } (Bubon Point) " } Pancel " } Bacuit Bay " } Cavern Island " } Observatory } Island - } Ursula Island } (Palawan, East } Coast) - } Port Royalist - Millman Island } (Palawan, West } Coast) - } Casuarina Point, } Barren Island " } Bird Island " } Tai-Tai Bay " } Batanes, Bashee } Islands - } Port Kok-si-kon } (Formosa, East } Coast) - } Tam-Sui Harbour } " } Kelung Harbour } (Formosa, N. } Coast) - }	h. m. 4 0 5 0 5 20 4 45 4 45 3 0 5 45 9 45 11 0 11 0 11 0 11 0 10 30 10 0 10 0 11 0 10 10 10 15 9 30 9 55 10 55 9 40 10 0 9 30 11 0 11 0 11 0 11 0? 10 27 9 30 9 30 9 30 9 30 11 30 11 45 10 30	ft. 10 15-18 15-18 7 13 11 6 6 5 12 5 6-8 6-8? 7 8-10 6½ 6 5½ 3½ 6 6 5½ 5½ 7½ 7½ 6½? 2½ 6½ 5½ 6 5½ 4 3 7-12 3	ft. 6 9				

\* From a French Survey, 1862.

ce.	High Water, Full and Change.	Rise.		Place.	High Water, Full, and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Point River -	2 0	7 $\frac{3}{4}$		Towan Island -	9 20	13	
Mar. -	1 40			Tai-chow Islands -	9 0	14	
April -	1 15	7-8		St. George Id. }			
May & June -	0 30			San-moon Bay }	10 20	15	
Mar. -	2 40	5 $\frac{1}{2}$		Kweshan Islands -	9 30	14	
May & June -	1 40	5 $\frac{1}{2}$		Nimrod Sound -	10 30	20	
Kiang River. }		5-6		Vernon Channel, }			
" -		3		Chusan Archipelago }	9 40	14	
g Road -	10 15	4 $\frac{1}{2}$		Ting-hae Harbour	11 0	12	9
roup -	10 0	5		Poo-too Island -	8 15	12	
Mirs Bay Id. Bias }	8 0	6 $\frac{1}{2}$		Lansew Bay -	10 0	13	
w Id. }	8 30			Volcano Islands -	11 30	15	
Bay -	10 0	6 $\frac{1}{2}$		East Saddle Island	11 0	14	
Point, in Bay }	7 0			Yung River, Chin-hae }	11 20	12 $\frac{1}{2}$	
int -	8 0			" Ning-po-fu }	1 0	9	
lay -	9 0	7?		Hang-chu Bay, Sesham Ids. }	11 45	14	
od Hope -	9 0	7?		" Fog Islands }	11 45	17	
ad, Na- }	11 15	7		" Chapu Road }	12 0	25	
ay -	11 0	6 $\frac{1}{2}$		Hang-chu Bay (off Can-pu) -		32	
Harbour d. Rees }	11 30	12		Gutzlaff Island -	11 30	15	
arbour (res) -	11 30	12		Yang-tse Kiang (entrance) -	12 0	15	10
er Harb. -	10 30	9 $\frac{1}{2}$	7	" entrance to Wusung River }	0 30	15	10 $\frac{1}{2}$
ay -	12 0	16		Pheasant Point, Wusung River }	0 35	13	8
ay -	12 15	16		Shanghai -	0 40	10	7
arbour -	10 20	16		†Langshan Crossing	1 40	12	8
ound -	12 25	17		<i>Yellow Sea.</i>			
trait -	12 30	17		Lo-shan-kan -	4 30	11	9
Ids. -	12 15?	16?		Staunton Island -	1 30		
Tem- }	9 0	18		Shihtau Bay -	1 30		
r, Lo-nd -	10 45	19	14 $\frac{1}{2}$	Aylen Bay -	2 40		
nd -	12 0			Wei-hai-wei Harbour -	9 30	9	
nd -	9 30	17		Lung-mun Harbour	10 0	7	
nd -	10 0	17		Chifu -	10 0	8	6 $\frac{1}{2}$
Harbour -	10 15	16		Miau-tau (Depôt Bay) -	10 35	6	
nds -	10 0	17		Peiho or Peking River (entr.)† -	3 10	10	8-9
Ids. -	8 30	17		Tien-tsin, Peiho River -		4 $\frac{1}{2}$	
g-Bullock }	8 30	17		Sand Point, Gulf of Liau-tung -	4 50	7	5 $\frac{3}{4}$
iver(entr.) City }	9 0	15 $\frac{1}{2}$		N.W. Head of Gulf of Liau-tung -	5 30	10	8 $\frac{3}{4}$
	9 30	15 $\frac{1}{2}$					

upon Docks—In March, the day and night tides rise to the same level. From April to October tides are the higher, and from November to February the lower. In May and June the level, & tides is 4 feet, and the neaps 2 feet higher than in March. Langshan Crossing the tide rises for 3 hours only, and falls for 9 hours.—H.M.S. Acteon, 1861. rise much affected by winds.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	N
Liau Ho (Bar) -	h. m.	ft.	ft.	Gulf of Tartary.			
" (entrance)	4 0	11			h. m.	ft.	ft.
Vansittarts Saddle	5 0	12	8½	St. Vladimir Bay	irr.	2	
Hulushan Bay -	4 20	10		Napoleon Road	2 30	2½	
Port Adams, Suli-	2 30	8		(West Coast) -			
van Bay -	0 15	8		Port Michael Sey-	5 30	3	
" Mary				mour			
" Island -	2 0	10		Barracouta Har-	10 0	3½	
Pigeon Bay -	11 45	8		bour			
Ta-lien-whan Bay	10 10	12	8	Castries Bay "	10 30	6	
Encounter Rock -	10 30	10		Jonquiere Bay	10 0	6	
Haiyun - tau	9 0	12		(East Coast) -			
(Thornton Haven)				Amur Strait -	11 40	5-6	
Chodo Id., Korea,	6 20	12		Kamchatka.			
W.C. }				Avatcha Bay -	3 30	6½	
Basil Bay "	4 15	18	10	New Zealand:—South or Stewart Island.			
Marjoribanks	3 30	29		Mason Bay -	11 10	8	
Harbour "				S.W. Cape -	12 0	7	
Ko-kun-to Group "	2 25	18	10	Port Pegasus -	11 50	8	
Port Hamilton,	8 30	11		Port Adventure -	12 20	8	
(Korea, S.C.) -				Patersons Inlet -	1 10	8	
Japan Sea.				Port William -	12 45	8	
Yung-hing Bay -	5 20	2½		Middle Island, East and North Coasts.			
Tsau-liang-hai or				Bluff Harbour -	1 18	8	
Chosau Harbour	7 45	7	5	Molyneux Bay -	3 0	8	
(Korea) -				Otago Harbour	2 50	7	
Nagasaki Bay	7 15	9	7½	(entrance) -			
(Nipon, S. C.) -				Akaroa Harbour -	3 24	8	
Tsu-sima Sound -	8 30	8		Port Cooper -	3 50	7½	
Simonoseki -	8 30	8	6	Kaikora Peninsula	5 30	8	
Sado (Yebisu) -	5 0	2		Cape Campbell -	6 0	8	
Tsugar Strait -	5 0	5		Port Underwood -	6 10	8	
Hakodadi Har-				Queen Charlotte			
bour, Yezo Id. }	5 0	3		Sound (entrance)	8 50	8	
Endermo Har-	5 30	6		Port Gore -	9 0	8	
bour, Yezo Id. }				Pelorus Sound	9 35	11	
La Perouse Strait	10 30	6		(entrance) -			
Yoku-hama, Yedo	6 0	6½	4½	Port Hardy -	9 55	8	
Bay -				Croisilles Harbour	9 0	12	
Tatiyama Bay -	5 50	5		Nelson -	9 50	14	
Fatsizio -	6 0	5		Massacre Bay. }	8 45	13	
Port Simoda -	5 0	3-5		Tasman Corner			
Heda Bay -		5½		—Motu Pipi }	9 50	14	
Enora Bay -		4		River, W. Ent. }			
Simidsu -	7 30	7	5	Cape Farewell -	9 20	14	
Urakami -	7 30	6		Middle Island, South and West Coasts.			
Oösima -	6 50	5		Ruapuke Id. (Fo-	1 0	8	
Tanabé Ki Chan-	6 0	6	5½	veaux St.) -			
nel -				Centre Id. (Fo-	12 15	8	
Uranouchi "		5		veaux St.) -			
Osaki "	5 55	6½		Preservation Inlet	11 20	8	
Kata "	6 4	6½		Chalky Inlet -	11 5	8	
Yura Harbour "	6 5	6½					
Naruto (Fukura) "	6 17	7					
Akasi -	6 36	6½?					
Awasima (Inland	0 14	7					
Sea) -							
Tomo (Seto-uchi)	11 0?		5				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ay -	11 15	10	8	Jervis Bay -	6 20	6 - 9	
und -	11 30	8	6	Port Jackson, }			
n Sound -	11 30	8	6	North Head - }	8 15		
und -	10 45	8	6	Sydney -	8 38	4½	4
ound -	9 15	8	6	Broken Bay -	8 0	6 - 9	
i Inlet -	11 20	7	6	Newcastle or Port }	9 45	6 - 7	
<i>th Island, South and West Coasts.</i>				Hunter -			
olson, }	4 30	5	3	Port Stephen -	9 0	6	
Harbour }				Manning River -	10 0		
und -	7 0	8	6	Port Macquarie -	8 56	4 - 5	
and -	9 0	6		Shoal Bay -	8 30		
a River -	10 0	8	6	Richmond River -	9 20		
i River -	10 15	8	6	Cape Byron -	9 45	6	
mouth }				Tweed River }	9 45	5 - 8	
aki) -	9 30	12	9	(Danger Point) }			
Harbour -	9 30	12		Moreton Bay -	9 30	3 - 7	
rbour -	10 0	12		Wide Bay -	9 0	6 - 8	
River -	9 30	12	9	Sandy Cape -	7 50	6 - 8	
Harbour }	9 30	13	10	Port Curtis -	9 40	10 - 12	
ce) -				Byron Bay -	9 45	6	
Harbour }	10 55	10	8	Wreck Reef, }	8 3	6	
ce) -				(Bird Islet) - }			
River }	9 45	0		Cato Bank -	8 0	6	
ce) -				Lady Elliot Islet, -	9 0	7 - 8	
okohu) -	10 15	10	7	Heron Islet, }	9 0	10	
ria Van }	8 0	7		Capricorn Group }			
ings Is- }	8 0	7		Keppel Bay -	9 30	9 - 14	
<i>North Island, East Coast.</i>				Great Barrier Reef	8 48	7	
iser -	6 0	6		Saumarez Reef -	8 0	6	
ay -	7 50	3		Frederick Reef -	8 0	6	
Bay -	6 5	6		Kenn Reef -	8 0	5½	
-	8 55	7		Middle Bellona Reefs	8 30	6	
y -	9 0	7		Avon Isles -	8 30	5	
Harbour -	7 10	6	4½	Chesterfield Islet -	8 30	5	
Bay -	7 21	7	5	Mellish Reef (Sand }	7 55	5 - 6	
er Island }	6 25	10	7	Cay) - }			
Cove) - }	7 5	11	9	Thirsty Sound -	10 45	12 - 18	
Harbour -	6 30	10	7	Port Bowen -	9 35	16	
land -	7 0	9	7	Shoal Water Bay -	10 30	12 - 18	
Harbour -	7 0	9	7	Broad Sound -	11 0	20 - 30	
Harbour -	7 10	9	7	Swain Reefs -	10 25	10	
u Harbour }	7 15	9	6	Percy Isles, Middle }	10 30	16	13
Islands, }	8 15	7		or No. 2 Island - }			
ea Islet) }	8 0	7		(West Bay) - }			
Harbour -	8 15	9	7	" South or }	10 30	14	
lands -	7 44	7		No. 1 Islet, }			
Harbour -	7 54	7		(N.W. Bay) - }	10 20	24	
iver -				West Hill -	11 0	18	
enga }				Cape Conway -	6 45	6	
r - }				Goold Island -	9 30	6	
<i>Australia, East Coast.</i>				Port Denison -	9 0	6	
Bay -	10 0	7	5	Upstart Bay -	7 30	10 - 12	
ay -	8 15	7 - 8		Cleveland Bay -	9 28	6 - 10	
				Dunk Island -	9 15	7 - 12	
				Fitz-Roy Island -	8 0	5 - 10	
				Endeavour River -			
				Trinity Opening, }	9 15	7 - 12	
				Great Barrier }			
				Reefs - }			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
				<i>Australia, West Coast.</i>			
Lizard Island -	h. m. 9 15	ft. 7 - 10	ft.	Cockburn Sound -	h. m. 9 0	ft. 1 - 1½	
Willis Islets -	8 0	6		Warnboro' Sound -		3 - 4	
Osprey Reef -	8 36	6		Koombanah Bay -	9 0	½ - 3	
Flinders Group -	9 15	8 - 12		Port Grey, Swan } River - - }	9 0	1 - 1½	
Cape Sidmouth -	9 15	10					
Cape York -	11 15	10	7				
<i>Torres Strait.</i>				<i>Australia, South Coast.</i>			
Sir Cs. Hardy Is. -	9 15	10		Corner Inlet -	11 40	8	
Raine Island -	8 10	10		Wilson Promon- } tory - - }	2 0	10	
Wallis Island -	Irreg.	7		Port Western -	1 10	8	
Cape Possession -	9 0	6		Port Philip, Entrance	1 30	3 - 4	
Possession Island -	1 0	9½		" Queenscliff	1 30	3	
Darnley Island -	9 30	12		" Capel Bay	2 30	3 - 4	
Bramble Cay -	9 15	12		" Hobson Bay	3 0	3 - 4	
Murray Islands -	9 30	10		Melbourne -	1 20	3	
Adolphus Island -	12 15	10		Lady Bay -		4	
Albany Islands } (Port Albany)	12 15	10	7	Geelong Harbour -	2 50	2½	
<i>Australia, North Coast.</i>				Port Fairy -		4	
Endeavour Strait, } F. Entrance - }	1 0	9½		Portland Bay -	Midnight	4	
Booby Island -	4 30	8		Macdonnell Bay -	3 0	5	
Albert River (Kan- } garoo Point - }	7 30	10 - 13		Rivoli Bay -	10 0	4	
Wellesley Isles -	7 30	8 - 12		Port Elliot -		5 - 6	
Sir E. Pellew Isds.	7 30	4 - 7		Troubridge Shoals	3 30	6	
Investigator Road -	8 0	9		Port Adelaide -	5 44	6	
Arnhem Bay -	8 0	6 - 8		Cape Willoughby, } Kangaroo Id. - }	4 10	6	
Goulburn Isles -	6 0			Pelican Lagoon, } Kangaroo Id. - }	5 0	6	
Alligator River -	8 40	19 - 20		Spencer Gulf:			
Shoal Bay -	6 0	18 - 25	14 - 20	Thorny Passage	12 0	6 - 8	
Port Essington -	3 24	13		Point Riley -	5 45	4½	
St. Asaph Bay -	5 45	14		Point Lowly -	7 0	6 - 8	
Swift Bay -	12 0	21		Port Augusta* -	8 30	9-12	
Port Darwin -	5 30	17 - 24		Wallaroo -	irr.	4 - 5	
<i>Australia, North West Coast.</i>				Gambier Islands -	1 50	3	
Victoria River, } Turtle Point - }	7 15	15 - 24		Port Eyre -	10 30	6	
" Mosquito Flat	0 19	7 - 13		St. Francis Isle, }	12 0	6	
" Sandy Island	1 17	3 - 10		Petrel Bay - }			
Prince Frederick } Harbour - - }	12 0	28		Blancheport, }	1 0	5	
St. George Basin -	12 15	25		Streaky Bay - }			
Careening Bay -	11 45	30		Smoky Bay -	12 15	6	
Admiralty Gulf -	12 0			Denial Bay -	12 15	6	
Brunswick Bay -	12 0	24		Fowlers Bay -	10 30	6	
Camden Harbour -	12 0	37½		Venus Harbour -	2 15	6	
Collier Bay -	11 45	36		West Cape Howe -	9 0	6	
Sharks Bay -	12 0	2-5		Princess Royal } Harbour - - }	11 56	1 - 4	
Houtman Rocks -	11 30	2½		<i>Bass Strait.</i>			
Champion Bay -	9 10	1		Refuge Cove -	12 5		
				King Island -	1 0		
				Hunter Island -	11 30	8	
				Three Hummock } Island, E. side - }	10 30	10	
				Swan Island -	9 35	6	
				Glennie Islands -	12 20		
				Kent Island -	11 10		
				Murray Pass -	11 10	8	

\* At Port Augusta, when the wind veers round to West and South and blows strong, the rise has been as much as 16 feet. Commander John Hutchison, R.N., Admiralty Survey, South Australia, 1862.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Charge.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Tasmania.</i>							
	h. m.	ft.	ft.		h. m.	ft.	ft.
R. George	11 15	12½		Pouinipet Island, }	6 0	4½	
-				Caroline Islands }			
Launceston	1 0	12½		Seypan Island, }	6 45	2½	
thur	7 52	4		(Ladrone Ids.)- }			
wn	8 15	4½	3½	Pelew Islands		6	
rie Har-	7 30	3		<i>South America, Strait of Magellan.</i>			
-				Cape Virgin	8 30	36 - 42	
Head	12 0	9		Cape Espiritu Santo	8 30	36 - 42	
Har	1 0	6		Possession Bay	9 0	36 - 42	
Lrymple	12 5	10	7	Cape Orange	3 0		
ne Point	9 39	7		First Narrows	9 0	36 - 42	
<i>Islands in South Pacific.</i>							
Island	2 0			Philip Bay, east side	9 30	24	
and	2 40	3		Gregory Bay	9 45	23	
Id.		3		Second Narrows	10 0	23	
Otaheite Id.	noon.	1¼		Peckett Harbour	12 0	6	
on Bay, }				Laredo Bay	11 30	9	
Christina, }	2 30	4		Santa Magdalena }	12 0	10	
uesas - }				Island - }			
Is Id.		4		Port Famine	12 0	6	
bu	6 50	4		Cape San Isidro	1 0	8	
Resolution, }				St. Nicolas Bay	2 6		
a Island - }	5 35	3		Cape Froward	1 0		
Aneiteum,				Port San Antonio	12 0	7	
ig	6 35	4		Labyrinth Islands	0 30	5½	
or Futuna	7 24	4		Port Gallant	9 0	5½	
ood Bay, }	6 0	6?		York Road, }	2 0	9	
Islands - }				English Reach }			
akulan or				Bachelor River	1 40	5	
Road, }	6 47	5½		Borja Bay	1 50	6½	
Ids. - }				Playa Parda Cove	1 8		
Harbour, }				Port Tamar	3 5	5	
Caledonia	6 30	4?		Valentine Harbour	2 0		
o, Isle of				Harbour of Mercy	1 22	4	
New	8 6	4		Cape Pillar	1 0		
onia				<i>Smyth, Sarmiento, Wide, and Messier Channels.</i>			
Bay, New				Goods Bay	0 30	7	
onia				Fortune Bay	0 50	7	
e France, }	8 25	4		Welcome Bay	0 50	7½	
Caledonia				Puerto Bueno	1 40	8?	
Vincent, }	5 50	4½		Guia Narrows	2 10	8	
Caledonia				Fury Cove	1 15		
rk Island	7 15	4		Eden Harbour	12 30	5	
le Archip. }				Halt Bay	0 30	8	
teret, New		6		Middle Island	12 0		
id				<i>Tierra del Fuego, S.W. Coast.</i>			
owe Island	8 30	6		Cape Horn	4 40	9	
Island	7 45	7		St. Francis Bay	4 0		
ll Island	12 0	5		St. Martin Cove	3 50	8	
r Sunday Id.	6 0	5		Middle Cove	3 30		
<i>Islands in North Pacific.</i>							
Bay, }	3 49			Goree Road	4 0	8	
ee				Lennox Cove	4 40	8	
ru, Sand-	4 0	2		Nassau Bay	4 0	6	
Islands - }				Good Success Bay	4 3	6-8	
				Packsaddle Bay	3 30	6	
				Orange Bay	3 30	5	
				New-year Sound	3 30		

[illegible]



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.	Central America, West Coast.			
					h. m.	ft.	ft.
Nicoya Gulf (Port Herradura)	3 9	10					
Port San Juan del Sur	3 8?	10?					
Port Realejo	3 6	11					
Port la Union, G. of Fonseca	3 15	10½	8½				
Acajutla Road	2 25	9					
Mexico, West Coast.							
Port Guatulco	1 30	5					
" Sacrificios	3 15	6					
Acapulco	3 6	1½					
San Blas	9 41	6½					
Mazatlan	9 40	7					
Guaymas Harbour	8 0	4					
California and Oregon.							
San Lucas Bay	9 20	9½					
Magdalene Bay	7 35	6½					
Port San Quentin	9 5	9					
Bartholomew	9 10?	7-9?					
Playa Marie Bay	9 20?	7-9?					
Cerro Island	9 10	7-9					
Sta. Barbara Island	8 0	3½					
San Diego Bay *	9 38	5	3½				
San Juan Anchorage	9 40?	5					
San Pedro Bay *	9 39	4½	3½				
San Miguel, (Cuyler Harb. *)	9 25	5	4				
San Rosa Island	9 30?	5?	4?				
Santa Catalina Id.	9 35?	5?	4?				
Santa Cruz Id.	9 35?	5?	4?				
San Luis Obispo *	10 8	4½	3½				
Monterey *	10 22	4½	3½				
South Farallon *	10 37	4½	3½				
San Francisco							
" North Beach *	12 6	4½	3½				
Bodega Port *	11 17	4½	3½				
Humboldt Bay *	12 2	5½	4½				
Port Orford *	11 26	6½	4½				
Columbia River, Entrance	0 15	7½					
Astoria *	0 42	7½	6				
Nee-ah Harbour *	12 33	7½	6½				
Port Townsend *	3 49	5½	5				
Fort Steilacoom *	4 46	11	9½				
Vancouver Island and Juan de Fuca Strait.							
Esquimalt	irr.†	7-10	5-8				
Fane Island, Pumper Sound	irr.	12					
Victoria	irr.	7-10					
Port Discovery	2 30	7					

U.S. Survey, the times of High Water being the Corrected and not the Vulgar Establishment.  
 May to October, from Midnight to 3 am. November to April from Noon to 3 pm.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	
Nisqually, Puget Sound -	6 0	18	15	Shucartie Bay -		12	
Semishmoos Bay -				Bull Harbour, } Goletas Channel }	0 30	12½	
(Drayton Harbour) -	2 0	12		Barclay Sound, } Island Harbour }	12 0	12	
Fraser River (entrance) -	6 30	7-10		" Uchucklesit Harbour -		12	
Burrard Inlet, G. of Georgia -	6 0	16		Clayoquot Sound -	12 0	12	
Plumper Cove, Howe Sound* -	noon.	12					
Port Graves " -	noon.	12		<i>America, North West Coast.</i>			
Nanaimo Harbour -	5 0	14		Port Kuper -	1 40	13	
G. of Georgia -				Portland Inlet, } (Salmon Cove) }	1 8	16	
Nanoose Harbour, Vancouver Id. -	5 0	15		Sitka† -	0 34	5-7	
Penden Harbour, Strt. of Georgia* -	6 0	12-14		Behring Bay -	0 30	9	
Gowlland Harb., Discovery Passage -	5 30	11		Port Etches -	1 15	9½	
Knox Bay -		11		" Chalmers -	1 0	13½	
Beaver Cove -		15		" Chatham -	1 0	12	
Alert Bay, Cormorant Id. -		15		Oonahkahka Island -	7 30	7½	
Beaver Harbour -	0 30	15½		Cape Roshnoff -	7 30	15	
				Good-news Bay -	6 15	13½	
				Golovnin Bay -	6 23	3½	
				Port Clarence -	4 25		
				Chamisso Island -	4 42		

\* From observations made in the month of October.

† The rise at Sitka as given by Commander Pearce, H.M.S. Alert, in his remarks in 1860, does exceed 7 feet, but on the authority of Commander Pike, H.M.S. Devastation (1862), the local say that the rise sometimes is as much as 16 feet.

## T I M E

OF

## HIGH WATER ON FULL AND CHANGE DAYS

AT THE PLACES GIVEN IN THE PRECEDING PAGES;

## ARRANGED ALPHABETICALLY;

*With the Rise of the Tide at Springs and Neaps.\**

ery, thus?, is placed after the Time of High Water and the Rise, it indicates that what are given are approximations.)

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
hamas - -	8 0	3		Aggerminde, Jutland -	4 9	2	
ad, England -	11 10	23	17½	Agnes, St., Scilly Isles -	4 30	16	12
ri, Indian Ocean	8 30	6		Agoda Pnt., Hindoostan,	10 30	9	
Scotland - -	1 0	12	10	W. Coast.			
r, Wales - -	8 0	15		Agulhas Cape, Africa, S.	2 50	5	
, France - -	4 14	22	16	Coast.			
th, Wales -	7 31	13½	10	Air Point, River Dee,	10 54	25	19
Brazil -	4 48	6		England.			
atagonia, W.C.	0 50	18		Aix, Ile d', Charente R.,	3 20	17	12½
, Persian Gulf	7 30	7		France.			
entral America	2 25	9		Akaroa Harb., New Zea-	3 24	8	6
Mexico, W. Cst.	3 6	1½		land.			
ad, Sumatra -	8 45	8		Akasi, Japan Sea -	6 36	6½?	
Ireland - -	5 14	10½	8	Akyab, Aracan R., Bay	9 45	9	6
ort, (Sullivan	0 15	8		of Bengal.			
low Sea.				Al Bidá, Persian Gulf -	8 30?	6?	
— (Mary Id.)	2 0	10		Alabat Harbour, Luzon -	10 0	9	
Sea.				Alan Island, Patagonia,	0 31	18	
ort, Australia,	5 44	6		W. Coast.			
adjacent Bays,	{ 7 30 to			Albany Ids. (Port Albany)	12 15	10	7
S. E. Coast.	{ 9 30 }	7	4½	Australia, E. Coast.			
Flores, Malay		8		Albemarle Id., Galapagos	2 0	6	
Iago.				Fort, Falkland	7 15	7	
G., Australia,	12 0			Islands.			
ast.				Albert River (Kangaroo	7 30	10-13	
d., Torres Strt.	12 15	10		Point) Australia, N.			
l, Maldives -	1 0	4		Coast.			
te Atoll, Mal.	3 0	4		Aldborough, England -	10 45	8?	6½?
				Alderney, English Chan-	6 46	17	12½
Cove, Tierra	3 10	4		Alert Bay, Cormorant		15	
o.				Id., Johnstone Strait,			
Port, New	12 20	8	6	Vancouver Id.			
-Sound, Falk-	5 30	5½		Alexander Port, Africa,	3 0	5	
nds.				S.W. Coast.			
Santa Cruz,	12 45	9		Algeciras, Spain -	1 49	4	2½
				Algoa B., Africa, S. Cst.	4 0	4-5	
				Alligator Rvr. Australia,	8 40	19-20	
				N. Coast.			

Rise of the Tide is meant its vertical rise above the mean low-water level of Spring Tides.

M

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Ri
		Springs.	Neaps.			
Alloa, Firth of Forth, Scotland.	h. m. 3 18	ft. 17½	ft. 15	Aor Pulo, Sumatra, N.E. Coast.	h. m.	ft. 5
Altona, Germany - -	5 19	7		Aotea Harb., New Zealand	10 0	12
Amboyana, Moluccas -	0 33	7		Apalachicola B., Gulf of Mexico.		2½-4
Ameland Gat, Netherlands	9 0	7		Appetetat B., Gulf St. Lawrence.	11 10	5?
— Hollum Rd., „	11 30	7		Appin Port (Loch Linnhe), Scotland.	5 26	12½
Amet Sound, Nova Scotia	10 30	8	5	Appledore, England -	5 28	23
Amiranté Isles, (St. Joseph Id.) Indian Ocean.	5 0	8½		Aquin Bay, St. Domingo	irr.	2-3?
Amlwch, Wales - -	10 30	18?	13?	Aracan R. (Bar), Bay of Bengal, E. Coast.	9 45	9
Amoy (Inner Harbour), China, East Coast.	12 0	16		Aracati, Brazil - -	6 0	8
Ampanam B., Lombock -	8 0	6		Araish El, Africa, N. Cst.	1 30	9-12
Amsterdam, Indian O. -	11 0	3		Arasaig, Scotland -	5 50	13½
Amulgawein, Persian G.	11 40	6		Arauco Bay, Chile - -	10 15	
Amur Strait, G. of Tartary	11 40	5-6		Arbroath, Scotland -	1 35	14
Andaman Ids., Port Blair, Indian Ocean.	10 0	9	6	Arcachon, France - -	4 37	11½
— Port Cornwallis	10 0	8½		Arcas Rks. G. of Mexico	noon	1½
— Strait, Indian Ocean.	10 24	9½		Ardglass, Ireland -	11 0	16
Andrava Bay, Madagascar.	3 30	7		Ardintallan, Loch Feochan, Scotland.	5 31	9
Andres, San B., Patagonia, W. Coast.	0 45	5		Ardriahag, Loch Fyne -	11 53	9
Andrews, St., Bay, G. of Mexico.	irr.	1-2		Ardrossan, Scotland -	11 45	10
Anegada, Virgin Islands	9 0	1½		Arenas Pt., San Carlos, Patagonia, W. Coast.	0 14	6
Aneiteum, Inyang, S. Pacific.	6 35	4		Argyle, Bay of Fundy -	9 27	12½
Angoxa River, Africa, E.C.		13		Arica Road, Peru - -	8 0	5
Angra, Azores - -	12 32	4½		Arichat, Nova Scotia -	8 10	5
— Bank, Hindoostan, W. Coast.	10 30	9		Arinagour, Coll Id., Scotland, W. Coast.	5 39	12½
— Pequena, Africa, S.W. Coast.	2 30	8		Arkhangel, White Sea -	7 28	2½
Anna Pink B., Patagonia, W. Coast.	0 45	5		Arklow, Ireland - -	8 45	4
Annan Foot, England -	11 56	20	14	Arnheim B., Australia, N.C.	8 0	6-8
Annapolis, United States	4 38	1	1	Arroa, Malacca Strait -		10
Anne, St. B., Cape Breton	8 34	6	4½	Arthur Port, Tasmania -	7 52	4
Annisquam, United States	11 0	10½	9	Arundel, England - -	12 25	
Anno Bom Id., Africa	3 45	5		— (Bar) - -	11 35	16
Anticosti Id., G. St. Lawrence, East Cape -	1 0	5	3	As Rocas, S. Atlantic -	5 15	10
„ Bear Bay -	1 10	5	3	Asaph St., B., Australia, N. Coast.	5 45	14
„ West Point -	2 0	6	4	Ascension Id., S. Atlantic	5 30	2
Antigonish Harb. R. St. Lawrence.	9 0	4	2	Askaig Port, Islay -	4 58	6½
Antigua Id. (English Harb.), Caribbean Sea.		2		Astoria, Oregon -	0 42	7½
Antongil Bay (Port Choiseul), Madagascar.	4 0	5		Atacames Bay, Ecuador	3 37	13
Antonio Cape St., Cuba		1½		Atchafalay Bay, G. of Mexico.	irr.	2-2½
Antonio St. Port, Patagonia, E. Coast.	10 40	28		Athline, Loch Seaforth -	6 16	15
— Magellan Strait.	12 0	7		Atico Road, Peru - -	8 53	5
Antrobus Id., G. St. Lawrence.	10 30	5	3	Auckland Harb., New Zealand, N. Island.	7 5	11
Antwerp, Belgium - -	4 25	15		Augustine St., U. States	8 21	5
				— St. B., Madagascar, W. Coast.	4 30	13
				Aux Cayes Bay, St. Domingo.	irr.	2-3?
				Avatcha B., Kamchatka -	3 30	6½
				Avon Isles, Australia, E.C.	8 30	5
				Avon River, Bigbury Bay, England.	5 47	16½

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
a (Inland Sea)	h. m. 0 14	ft. 7	ft.	Barbados, Caribbee Ids.	h. m. irr.	ft. 2	ft.
R., New Zealand	7 44	7		Barbara Port, Patagonia, W. Coast.	12 28	6	4
frica, W. Coast-	4 30	4		— I. Santa, California	8 0	3½	
ay, Yellow Sea	2 40			Barbe St., Sumatra, N.E. Coast.	6 0	6	
, Persian Gulf -	11 20	6		— Sta. Id., California	8 0	3½	
tland - -	11 50	8½	7½	Barclay Sound (Island Harbour), Vancouver Island.	12 0	12	
int of, I. of Man	11 7	20?	16?	— Uchucklesit Har-		12	
landeb, G. of Aden	12 0	7		bour, Vancouver Id.			
River, Magellan	1 40	5		Bardsey Id., Wales -	7 40	15	
, China Sea, E.C.	10 0	6		Barfleur, France - -	8 51	17	13½
i., Linga Bay,	6 0 PM	12		Barmouth, Wales - -	7 41	17	13½
ra.*				Barnstable, United States	11 22	10	8½
3. (S. Cst.), Baly	11 0	9½	11	Barnstable Bar, England	5 30	19	14
River, Sherbro				Barnstable Bridge, Eng-	6 28	10½	7½
Africa.				land.			
razil - -	3 30	8		Barquero (entrance),	3 0	15	
Persian Gulf -	5 30	7		Spain, N. Coast.			
Id., China Sea,	11 0	5		Barra, Id. (North Har-	5 48	11½	8½
st.				bour), Scotland, W. C.			
arb., New Cale-	6 30	4?		Barracouta Harb., G. of	10 0	3½	
agan Id., Borneo,	10 0	6-8		Tartary.			
st.				Barragan Bay, Rio de la	7 0	5-9	
R., B. of Bengal,	10 0	15		Plata.*			
st.				Barren Id., China Sea, E.	9 30	5½	
n, Ireland -	10 40	11		Coast.			
d, United States	7 26	5	4½	Barren Ids., Madagascar	4 45	12	
ish (Loch	5 43	11		Barrow Harbour, New-	7 10?	5?	
, Scotland.				foundland.			
arty, Dungarvan,	5 12	12½	9½	Barton Port, (Bubon	10 55	6	
				Point), China Sea E.C.			
llig Bay, Ireland	3 40	12	7½	Bas, Ile de, France -	4 49	23	17
le B., Ireland -	6 25	3	2	Básidúh, Persian Gulf -	12 0	10	
n, Ireland -	4 54	12	9½	Basil Bay, Korea, W. C.	4 15	18	10
ane, Kenmare	3 42	10½	7½	Basque Port, Newfound-	8 55	5½	3½
Ireland.				land.			
ll Bay, Ireland	4 40	12½	9½	Basrah (Bar), Persian	12 0		
(Bar), Ireland	5 22	11½	8½	Gulf.			
re (Quay),	6 0	8½	5½	— Town - -	6 0?	9?	
				Bassein R., Bay of Bengal.	10 0	9	6
non (Bar) -	5 18	11½	8½	Batanes, Bashee Islands,		4	
, Ireland -	5 23	12½	8	China Sea, E. Coast.			
tland - -	9 45	6	4½	Batavia, Java - -	10 0	2	
, Ireland - -	4 23	10½	8½	Batchian, Gilolo, Moluccas	1 0	6	
United States	6 33	1½	1½	Bate (Gulf of Cutch),	12 20	12	8
s., Africa, W.C.	8 15	9		Hindoostan, W. Coast.			
R., (entrance)	2 0	12		Bathurst, G. St. Lawrence	3 15	7	4
stan, W. Coast.				Bathz, Netherlands -	3 15	15	
oluccas -	4 0	6?		Batiscan, R. St. Lawrence	9 48	3½	2
úleh, G. of Aden	6 45	6		Batticalao River, Ceylon	5 0	2-3	
ri, Gulf of Aden	8 45			Bay of Harbours, Falk-	6 0	5	
iab, Ind. Ocean	7 0	7		land Islands.			
ikam, Arabia,	10 0	8½		Bay of Islands, (Motu	7 15	9	6
st.				Mea Islet,) New Zealand.			
tland - -	0 28	10½	8	Bay of Mercy, Banks Land		2	
ava - -		5		Bayonne (Bar), France -	3 45	12	10
rb., Ireland -	3 47	10	7½	Bazaruto Cape, Africa, E.C.	4 15	10	
Bay, Gulf of	irr.	1½		Beachy Head, England -	11 20	20	15

observations made in the month of September by W. Stanton, Master Commanding H.M. Brig Saracen.

Rio de la Plata the rise is greatly influenced by the winds, the water being raised by S.E. expressed by those from N.W., causing at Buenos Ayres a difference sometimes of 12 feet.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.
		Springs.	Neaps.			Springs.
	h. m.	ft.	ft.		h. m.	ft.
Bear Cape, Prince Edward Island.	9 0	6	3	Bias Bay (Tsangchow Id.) China, E. Coast.	8 30	
Bear Head, C. Breton Id.	8 30	4½	3	Bic Id., G. St. Lawrence	2 15	14
Beaubère Id., Gulf St. Lawrence.	6 30	6	4	Biddah R., B. of Bengal, W. Cst.	10 0	14
Beaufort, United States -	7 26	3½	2¾	Bideford, England -	6 7	16
Beaulieu, England -	{ 10 25 12 15	10	8½	Bijonga Islands, Arcas Channel, Africa, W. Cst.	10 10	11-14
Beaumaris, Wales -	10 32	21½	16½	Bissao, Africa, W. Cst.	11 0	8
Beaver Cove, Vancouver Island.		15		Orango Channel, Africa, W. Cst.	10 0	11
Harbour, Vancouver Island.	0 30	15¾		Bilbao (Bar), Spain -	3 0	13
Nova Scotia -	7 40	6½	4½	(Town), " -	3 20	9
Bedegue Harbour, Prince Edward Island.	10 15	7	5	Biloxi, G. of Mexico -	irr.	2
Bedford Bay, Tierra del Fuego.	0 30	7½		Bima Bay, Sumbawa -	Noon.	6
Behring Bay, America, N.W. Cst.	0 30	9		Binkang B. China Sea, W. Cst.	11 30	5
Belfast, Ireland -	10 43	9½	8	Binnic, France -	6 3	30
Belgrano Port, La Plata	6 0	12	10	Bintula R., China Sea, E. Cst.	5 45	6
Bell Sound, Spitzbergen	8 56	3½		Bird Island, China Sea, E. Cst.	9 30	6
Belles Amour B., Labrador	9 0	4½	2½	Ids., Africa, S. Cst.	4 0	4-5
Belligam Bay, Ceylon -	2 20	2½		Id. Light, United States.	7 59	5½
Bellona Reefs (Middle), Australia, E. Coast.	8 30	6		Blaavand Point, Jutland	1 44	5
Bembatooka Bay, Madagascar, W. Cst.	4 30	16		Black Ball Harb., Ireland	3 40	9½
Bembridge Pt., England	11 0	14	10½	Rock, Bay of Fundy	11 29	36
Bencoolen, Sumatra -	6 0	3-5		Blacksod Bay (Quay), Ireland.	4 47	10
Benevente, Brazil -	3 0	5		Blair Harb., China Sea, W. Cst.	8 50	9
Benguela, Africa, W. Cst.	2 30	5?		Blakeney, England -		9
Benin R., Africa, S. Cst.	4 30	7		(Bar) "	6 30	15
Benton Castle, Cleddau River, Wales.	6 23	20	14½	Blanche Port, Streaky Bay, Australia, S. Coast.	1 0	5
Berbereh or Burburra (Gulf of Aden) Africa, E. Cst.	7 15	9		Blankenberg, Belgium -	12 48	13
Berbice, Guayana -	4 30	11?		Blanco Cape, Africa, W. C.	11 46	6
Bergen, Norway -	1 30	4		Blas, San, Mexico, W. Cst.	9 41	6½
Berkeley Sound, Falkland Islands.	5 0	7		La Plata -	2 0	12
Bermudas: Ireland Id., N. Atlantic.	7 14	4		Blasket Islands, Ireland -	3 30	11½
Bernera, Loch Roag, Lewis Id.	6 11	11	8	Blewfields, Mosquito Coast	1 50	2
Berneray I., Sound of Harris.	6 11	13	9½	Bligh Sound, New Zealand.	10 45	8
Bersiap Point, Banka Strait.	6 30	12		Block Id., United States	7 36	3½
Bersimis R., Gulf St. Lawrence.	2 0	12	7	Bluff Cay, Bahamas -	7 0	4½
Berwick, Scotland -	2 18	13	11½	Bluff Harb., New Zealand	1 13	8
Betcheween Harb., G. St. Lawrence.	11 32	5	3	Blyth, England -	3 15	15
Beypoor R. (entrance), Hindoostan, W. Cst.	0 13	5		R., Southwold, England.	10 20	6½
Bias Bay (Tooniang Id.,) China E. Coast.	8 0			Bodega Port, California	11 17	4½
				Bodkin Light, United States.	5 42	1½
				Bojador Cape, Africa -	12 0	8?
				Bolt Head, England -	5 45	15?
				Bombay Dockyard, Hindoostan, W. Coast.	11 40	12-17
				Bonacca Id., Bay of Honduras.	9 0	1½

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Spain -	2 0	12½	8	Broken Bay, Australia,	8 0	6-9	
Esperance Harb.,	9 15	5	2½	E. Coast.			
St. Lawrence.				Broom Loch (Ullapool)	6 40	14½	10½
C., Africa, Wst.	5 0	9		Broughty Ferry, Scotland	2 22	14½	11
Island, Australia,	4 30	8		Brouwershaven, Nether-	2 15	10	8
Island.				lands.			
St. France -	6 50	14	12¾	Bruit River, Borneo -	3 0	11	
Magellan Strait	1 50	6½		Bruni R., China Sea, E.	11 0	12	
(Road) Germany	10 30	8-10		Coast.			
England -	5 15	25	17½	Brunsbüttel, Germany -	1 58	9	
Sluice), England	7 0	12		Brunswick B., Australia,	12 0	24	
Deep (Clay Hole),		21½		N.W. Cst.			
Job Hole -		17		Brush, Yarmouth, England		5¾	4½
Charlestown Naval	11 27	11½	10	Bubon Point, Port Barton,	10 55	6	
United States	11 12	11	9½	China Sea, E. Coast.			
Bay, Australia, E.	8 15	7-8		Buctouche River, G. St.	3 30?	4?	2½?
				Lawrence.			
R., Madagascar -	4 30?	15?		Budehaven, England -	5 45	23	17
France -	3 39	8½	6	Buenaventura Port, Cen-	4 0	13	
n Harb., Prince	8 40	5	2¾	tral America (Negrilla			
Island.				Reef).			
St. France -	11 25	25	19½	" off the town -	6 0	13	
Id., Indian Ocean, see Reunion Id.				Buenos Ayres, S. America,	12 0	3-5	
Najeli Bay) Mo-	1 0	6		E. Coast.*			
				Buffalo R. (entrance),	3 45	4½	
nd, S. Pacific -	2 40	3		Africa, S. Cst.			
ort, Australia, E.	9 35	16		Bulama Island (Arcas	10 10	14	11
				Channel), Africa, W.			
R. Clyde, Scot-	0 39	9		Coast.			
B., Madagascar,	4 30	15		Bull Harbour, Goletas	0 30	12½	
t.				Channel, Vancouver Id.			
Bay, Labrador -	8 45	4	2	Bull Id., Newfoundland	7 22	3½	2
Harbour, New-	7 0?	2-3?		Bulls Id. Bay, United States	7 16	5½	4½
nd.				Bulls Mouth (Achill	5 38	10½	7½
Cay, Torres Strt.	9 15	12		Sound, N. entrance,			
Pots, River St.	3 0	17	10	Ireland.			
nce.				Bulsaur R., Hindoostan,	1 45	18	
ver, Africa -	4 0	6		W. Cst.			
frica, E. Cst. -	4 30	8		Buluagan O'sta Ana Port,	12 0	5½	
ad, Ireland -	10 45	12	9½	Filipinas.			
iver, G. of Mexico.	irr.	1¾		Bunawe (Loch Etive),	7 54	5¾	
France -	5 51	31	23½	Scotland.			
ance -	3 47	19	13¾	Buncrana, Ireland -	5 40	16	
rt, United States	11 11	8	6½	Bunessan, Scotland -	5 24	12	8½
ter(Bar)England	6 50	35	26½	Burburra, see Berberah.			
on, England -	4 39	16	12	Burin Harbour, New-	8 45	6½	4½
England -	6 5	11½	7¾	foundland.			
Netherlands -	3 0	5		Burntisland, Firth of Forth,	2 24	16½	12¾
, England -	11 15	19¾	16	Scotland.			
Ging Road) Eng-	6 56	44	33	Burntisles, Kyles of Bute,	11 50	10	8
				Scotland.			
Bay, Sumbawa	1 0	11-12		Burong I., China Sea -	4 45	7	
Sound, Mada-	4 0	9½		Burrard Inlet, Gulf of	6 0	16	
E. Cst.				Georgia, America,			
ound, Australia,	11 0	20-30		N. W. Coast.			
				Burry Port, Wales -	6 1	25½	18½
en Har., Ireland.	5 0	10½	7½	Bushire, see Abú-shehr.			
er R. (entrance),	11 0	7½		Bussorah R. Bar, Persian	12 0		
E. Coast.				Gulf.			
				Busuanga, Burias Island	12 30	6	

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Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.
		Springs.	Neaps.			Springs.
	h. m.	ft.	ft.		h. m.	ft.
Button Islands, Hudson Strait.	6 50			Canso Gut (Plaister Cove), Nova Scotia.	9 10	4½
Byron Bay, Australia, E. Coast.	9 45	6		— Har., C. Breton Island.	7 48	6½
— Cape, Australia, E. Coast.	9 45	6		Cantin Cape, Africa -	10 0	10
Cabita Bay, New Granada.	3 40	12		Canton River (entrance), China.	10 0	8
Cacheo River, Africa, W. Coast.	7 45	8		Canton River } In Mar.	2 40	5½
Cadiz, Spain - -	1 45	9½		— " } In May & June	1 40	5½
Caen, France - -	10 57			Cape Coast Castle, Africa, W. Coast.	4 30	6
Caermarthen (Bar) -	6 10	26	19½	Cape May Landing, U.S.	8 19	6
Caernarvon, Wales -	9 33	13½	10½	Caracas River, Ecuador -	3 30	10
Calimitea, St. Domingo -	8 0½	1½		Carauquette Harbour, G. of St. Lawrence.	2 40	6
Cairnlough, Ireland -	10 51	5½	5	Cardiff, Wales - -	6 59	38
Cajeli Bay, Bouro -	1 0	6		Cardigan, Wales - -	7 1	12
Calais, France - -	11 49	19½	15½	— Bay, Prince Edward Island.	8 40	5
Calbuco Beach, Patagonia, W. Coast.	1 15	16		Careening Bay, Australia, N. W. Coast.	11 45	30
Calcasien Fort, Patagonia, W. Coast.	1 18 0 47	18		Carelmapu, Patagonia, W. Coast.	0 50	10
— River, Gulf of Mexico.		2½	1½	Cargados Garayos Shoals, Indian Ocean.	2 0	4
Calcutta, Bengal - -	2 30			Cargreen, R. Tamar, England.	5 47	14½
Caldy Island, Bristol Channel.	6 0	24?	16?	Caribou Harbour, Nova Scotia.	10 0	6
Calebar R., Africa, W. Cst.	5 0	9		Carleton Point, Gulf St. Lawrence.	3 0	6
Caledonia Harbour, New Granada.	11 40	1½	1	Carlingford (Bar or Cranfield Point), Ireland.	11 0	14
Calif Sound, Isle of Man.	11 17	16½	13	Carlisle Port, England -	12 10	20
Calicut Roads, Hindoostan, W. Coast.	0 15	5		Carlos, San, Port, Patagonia, W. Coast.	11 15	6
Callao Bay, Peru -	5 47	4		— (Arenas Point) Patagonia W. Coast.	0 14	6
Calshot (Castle Pt.), England.	11 30	13	9½	— (English Bank) Patagonia W. Coast.	0 4	
Calstock, R. Tamar, England.	6 6	12½	8½	Carlos, San, Port, Falkland Islands.	7 0	8
Camaguin, Babuyan Islands.	6 0	6		Carouge River, R. St. Lawrence.	7 15	16
Camarinas Port, Spain -	3 0	15		Carrigaholt, Ireland -	4 44	14
Cambing, Banda Sea, Camden Harb., Australia, N.W. Coast.	noon	6		Carsaig, Scotland -	5 28	10
Cameroon R., Africa, W. Coast.	4 0?	6		Cartagena, New Granada	11 0	1½
Campbell Cape, New Zealand.	6 0	8	6	Carteret, France - -	6 25	31
— Island South Pacific.	12 0	43?		— Port, New Ireland.		6
— Town, Gulf St. Lawrence.	4 0	10	7	Casumpeque H., Prince Edward Island.	5 40	3
Campbellton, Scotland -	11 45	8½	6	Cashla Bay, Ireland -	4 33	16
Campeche, Yucatan -	1 45	2½	2	Casquets, English Channel	6 45	15½
Campobello (Welchpool), B. of Fundy.	11 21	23½	20	Castillos, Cape, Rio de la Plata.*	8 30	2
Cancale, France - -	6 20	37	27	Castlereagh Cape, Tierra del Fuego.	2 50	4
Canna Id., Scotland, W. Coast.	6 19	14	9½			

\* In the Rio de la Plata the rise is greatly influenced by the winds, the water being raised by winds and depressed by those from N.W., causing at Buenos Ayres a difference sometimes of 12 ft.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
1, Bearhaven,	4 14	9½	7½	Charlowka R., Lapland	8 8	12	
Isle of Man -	11 10	20	16	Chateau Bay, Labrador -	7 35	3½	1
Island, Ireland -	4 21	10½	8	Chatham, England -	1 2	17½	14
Is. G. of Tartary	10 30	6		Id., Galapagos	2 23	6½	
Patagonia, W. Coast.	0 11	18		Port, America,	1 0	12	
Point, China	9 30	6½		N. W. Coast.			
Coast.				Chatte Cape, United States	12 0	13	8
Harbour, New-	7 0	6	4	Chauan Bay, China, E.	11 0	6½	
nd.				Coast.			
Sta. L., Brazil -	2 30	3		Chausey, Isles de, France	6 9	35	26
Australia, E.C.	8 0	6		Cheduba, Bay of Bengal	11 30	8	
Cape, Yucatan -	9 30	1½		Chee-fow Harb., Yellow			
Bridge, Stour	1 8	4½		Sea, see Chifu.			
England.				Chentabun River, China	10 0	5½	
s., New Zealand	8 0	7		Sea, W. Coast.			
land, China Sea,	9 30	5½		Chepo River, New Gra-	3 40	16	
it.				nada.			
lands, Gulf St.	1 50	9	5	Chepstow, England -	7 30	38	28½
ce.				Cherbaniani Reef, Laccadives, Indian Ocean.	10 0	7	4
t, United States	9 30	1½	1½	Cherbourg, France -	7 49	17	12½
Channel, U.S.	9 10	1½	1½	Chesilton, England -	6 13	10½	7
Guayana -	3 45	6-11		Chester (Crane Wharf),	0 16	26	
France -	11 5	27½	21	England.			
ys, United States	0 51	3½	2½	Chester River (Rockhall	5 23	2½	1
Spain, N. Coast	3 0	15		Creek), United States.			
L., (Foveaux St.)	12 15	8	6	Chesterfield Islet, Aus-	8 30	5	
aland.				tralia, E. Coast.			
ahaaay Harbour,	6 0	3		Chetican, C. Breton Id. -	8 15	3½	
cas.				Chichester, England -	11 30	14	11
L., California -	9 10	7-9	½	Chifu, Yellow Sea -	10 0	8	6½
frica, N Coast -	2 6	3½		Chimmo Bay, China, E.	10 20	16	
icara Id., Trin-	3 30	4		Coast.			
Jaribbean Sea.				Chimney Id., Rees Pass,	11 30	12	
Bay, Patagonia,	0 40	14		China, E. Coast.			
ast.				Chinchu Harb., China,	12 25	17	
Narrows, Pata-	1 15	16		E. Coast.			
W. Coast.				Chin-hae, Yung R., China,	11 20	12½	
Inlet, New	11 5	8	6	E. Coast.			
id.				Chipiona, Spain -	1 34	12½	8
s Port, America,	1 0	13½		Chittagong (Bar), Bay of	1 15	15	10
Coast.				Bengal, E. Coast.			
Bay, New Gra-	4 0	16		Chodo Id., Korea, W. C.	6 20	12	
				Choiseul Port, Madagascar,	4 0	5	
o Id., America,	4 42			E. Coast.			
Coast.				Chosan Harb. or Tsau-	7 45	7	5
on Bay, Australia	9 10	1		liang-hai, Japan Sea.			
oast.				Christchurch, England -	{ 9 0 }	5	
ain R., St. Law-	9 45	3	2	Christianstad, Santa	{ 11 30 }	½	
				Cruz.	7 30		
ni Id., China, E.C.	9 30	17		Christmas Island, Indian	10 0		
es Ids., Patagonia,	0 35			Ocean.			
oast.				Christmas Harbour, Ker-	2 0	2	
Road, Hang-chu	12 0	25		guelen Id.			
China, E. Coast.				Chuen-pee Point, Canton	2 0	7½	
Cape, United	7 45	5		River.			
s.				Chusan Archipelago,	9 40	14	
Id., Galapagos	2 10	6	5	(Vernon Channel,)			
ton, United States	7 26	6	7	China, E. Coast.			
etown, Prince	10 45	9½					
rd Island.							

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Chusan Tinghae, China, E. Coast.	h. m. 11 0	ft. 12	9	Componee River, Africa, W. Coast.	h. m. 10 0	ft. 15	1
Circular Head, Tasmania	12 0	9		Compu Inlet, Patagonia, W. Coast.	1 10	17	1
Clam Point, B. of Fundy	8 27	8½	6½	Concarneau, France -	3 12	13	
Clara Sta., I., Ecuador -	4 0	11		Condore, Cochin China -	3 0	4	
Clare I., Ireland -	4 38	12½	9½	Congo River, Africa -	4 30	6	
Clarence Port, America, N.W. Coast	4 25			Congoon Bay, Persian G.	7 45	9½	
Clarence Harbour, Long Island, Bahamas.	8 30	4	3½	Conil, Spain -	1 18	11½	
Clarke Harbour, Bay of Fundy.	8 40	9½		Conquet Road, France -	3 46	21	1
Clayoquot Sound, Vancouver Id.	12 0	12	7	Constitution Cove, Bolivia	10 0	4	
Clear, Cape, Ireland -	4 0	9	6½	Conway Cape, Australia, E. Coast.	11 0	18	
Clearwater Point, Gulf St. Lawrence.	11 30	5	3	Cook Harb. Newfoundland	7 25		
Cleveland Bay, Australia, E. Coast.	7 30	10-12		Cooper Port, New Zealand.	3 50	7½	
Cley, England, N.E. Cst.		5½		Copiapo, Chile - -	8 30	5	
Clifden Bay, Ireland, W. Coast.	4 30	13½	10	Coquet Road, England -	3 0	14½	1
Clinch Fort, Fernandina, United States	7 53	6½	6½	Coquimbo Bay, Chile -	9 8	5	
Clonakilty, Bay, Ireland	4 30	11	8½	Cordouan Lthse., France	3 37	13½	10
Coacocho Bay, G. of St. Lawrence.	10 30	5	3	Corentyn River, Guayana	5 10	8½	
Cobija Bay, Bolivia -	9 54	4		Coringa or Cocanada Bay, Bay of Bengal, W. C.	9 10	4-5	
Cocagne River, G. St. Lawrence.	7 30?	4?	2?	Coringa R. (Bar), Bay of Bengal, W. Coast.	9 0	5	
Cochin Harb. and Road, Hindoostan, W. Coast.	1 0	3½		Corisco Bay (Elobey Isles), Africa, W. Cst.	5 0	7	
Cockburn Port, Africa, E. Coast.	4 15	12		Cork (Penrose Quay), Ireland.	4 58	12½	10
Cockburn Sound, Australia, W. Coast.	9 0	1-1½		Corn Ids., B. of Honduras	1 45	2	
Cockenzie, Firth of Forth, Scotland.	2 16	15½	13	Corner Inlet, S. Australia	11 40	8	
Cod Cape, United States	11 30	13		Cornwall, Cape, England	4 35	18?	13
Codroy Island, Newfoundland.	9 15	6	4	Corpach (Loch Aber), Scotland.	5 59	11½	
Colorado River, La Plata	4 0	9	7½	Corran (Loch Aber), Scotland.	5 43	12	8
Colorados, R. La Plata -	3 40	11		Corunna, Spain - -	3 0	15	
Cold Spring Inlet, United States.	7 32	5½	4½	Coudres Id. (Prairie Bay), R. St. Lawrence.	4 25	17	10
Coleraine, Ireland -	6 24	6½	4	Courseulles, France -	9 7	20	13
Collier Bay, Australia, N.W. Coast.	11 45	36		Courtmacsherry, Ireland	4 36	10½	8
Colne Point, Colne River, England.	12 0	14	10	Coverack, England -	4 35	14½	11
Colombilla Cay, Pearl Cays, Caribbean Sea.	2 0	2		Cowes (West), England	{ 10 45 } 12½	9	
Colombo, Ceylon -	1 0	2		Coy Inlet, Patagonia, E.C.	9 30	40	
Colonsay, Scotland -				Coyhuin River, Chile -	0 52	21	
Columbia River, (entr.) America, N.W. Coast.	0 15	7½		Cozumel, B. of Honduras	8 30	1½	
Comoro Islands, (Johanna I.) Indian Ocean.	3 30	8½		Crane Island, River St. Lawrence.	5 24	17	13
Comoro Islands, (Mayotto I.), Indian Ocean.	4 10	11½		Cranford Bay, Mulroy Bay, Ireland.	8 3	4	
				Crapaud, Prince Edward Island.	10 0	8	6
				Crimon Ids., Java Sea -	8 0	6	5
				Crinan, Scotland -	4 49	6½	5
				Croc Harbour, Newfoundland.	6 30?	4?	
				Croisilles Harbour, New Zealand.	9 0	12	8
				Cromarty, Scotland -	11 56	14	11

e.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
and -	7 0	14 $\frac{3}{4}$	11	Delagoa Bay (Portuguese Factory), Africa, S. Coast.	5 20	12	
Nova Scotia -	8 0	6 $\frac{1}{2}$	4 $\frac{1}{2}$	— Shefeen Id., Africa, S. Coast.	4 40	12	
Bahamas -	7 0	2 $\frac{1}{2}$		Delaware (Breakwater), United States.	8 0	4 $\frac{1}{2}$	3 $\frac{3}{4}$
Ireland -	4 9	9 $\frac{3}{4}$	8	Delftzyt, Germany -	11 15	8-10	
Patagonia,	12 0	6		Delgado C., Africa, E. C.	4 0	16	11 $\frac{1}{2}$
aint, River	1 45	19?	15?	Delhi River, Sumatra -	4 0	8	
ngland.				Demerara R., Guayana -	4 45	9	6
Ireland, W.	5 53	8 $\frac{3}{4}$	6	Denial Bay, Australia, S. Coast.	12 15	6	
assage Id., Sea.	9 0	1		Denison Port, Australia, E. Coast.	9 36	6	
atagonia, W.		20		Desire Port, Patagonia, E. Coast.	12 10	18 $\frac{1}{2}$	
, Galapagos	?	?		Devonport Dockyard, England.	5 43	15 $\frac{1}{2}$	11 $\frac{1}{2}$
asin, (Nack-of Fundy.	11 55	45 $\frac{1}{4}$	38	Dewghur Harbour, Hindoostan, W. Coast.	11 25	9	
Harbour,	12 6	6 $\frac{1}{2}$		Diamond Island, Bay of Bengal.	10 30	8	
er, China.				— Point, Malacca Strait.	12 0	9 $\frac{1}{2}$	
China, E. C.	8 0			Diego, San, Bay, California.	9 38	5	3 $\frac{3}{4}$
ew Granada	3 30	13		Diego, San, Cape, Tierra del Fuego.	4 30	10	
chelles, In-	5 10	7		— Garcia Island, Indian Ocean.	1 30	6	
ustralia, E. C.	9 40	10-12		— Ramirez Ids., Tierra del Fuego.	4 0	6	
ited States	7 40	4 $\frac{1}{4}$	3 $\frac{1}{2}$	Dielette, France -	6 40	27	20 $\frac{3}{4}$
our, New-	7 0 $\frac{1}{2}$	2-4?		Dieppe, France -	11 6	27	20 $\frac{1}{2}$
ermany -	1 8	10		Digby Gut, B. of Fundy	11 0	27 $\frac{1}{2}$	23
, California	9 25	5	4	Dingle, Ireland -	3 51	10 $\frac{1}{4}$	7 $\frac{3}{4}$
, New Zea-	11 30	8	6	Discovery Port, America, N. W. Coast.	2 30	7	
nce -	6 5	32	23 $\frac{1}{2}$	Dislocation Harb., Tierra del Fuego.	1 40	4	
, China Sea,	11 0	5		Diu Island, Hindoostan, W. Coast.	2 0	6	
atagonia, W.	0 26			Dives, France -	9 39	21	16
arb., G. St.	3 10	9		Divy Pt., Bay of Bengal		5	
i, Ireland -	10 45	13	11	Doboy Lighthouse, U. S.	7 33	7 $\frac{3}{4}$	7
, Madagascar	5 0	15		Dodandowe Bay, Ceylon	1 50	1 $\frac{1}{2}$	
t., Tasmania	12 5	10	7	Dodo River, Bight of Benin.	4 17	5	
Hindoostan,	1 30	17		Domingo, San, Port, Patagonia, W. Coast.	12 0	7	
it, Moluccas		11		Donaghadee, Ireland -	11 13	11 $\frac{1}{4}$	9
Hindoostan,	1 30	17		Donegal Harb., Ireland -	5 18	11 $\frac{1}{2}$	8 $\frac{1}{2}$
orres Strait	9 30	12		Doris Cove, Tierra del Fuego.	3 0	4	
ngland -	6 16	14 $\frac{1}{4}$	10 $\frac{1}{2}$	Dornock Road, Scotland	11 47	11	
hoiseul Sd.,	6 30	5 $\frac{1}{2}$		Douglas, Isle of Man -	11 12	20 $\frac{3}{4}$	16
lands.				— Road, Bahamas -	8 30	4	2 $\frac{1}{2}$
, Australia,	5 30	17-24		Dover, England -	11 12	18 $\frac{3}{4}$	15
Madagascar	4 30	7		Downham Reach, Orwell, England.	12 27	12	
North Sea	12 30	12	8				
l -	11 15	16	12 $\frac{1}{2}$				
Jurian Strait	5 0	10					
Orkneys -	10 30	10	7 $\frac{1}{2}$				
(Port Melca, S. Coast.	4 30	15					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Ri: Springs
		Springs.	Neaps.			
	h. m.	ft.	ft.		h. m.	ft.
Dragons Mouth, Carib- bean Sea.	3 0	4		Elliot Port, Australia, S.C.		5-6
Drayton Harb., St. Juan de Fuca Strait.	2 0	12		Emden, Germany -	12 0	
Drogheda (Bar), Ireland	11 0	11½	9	Ems River, (outer buoy), Germany.	10 0	8-10
Duart, Isle of Mull -	5 0	12	10	Encounter Rock, Yellow Sea.	10 30	10
Dublin (Bar), Ireland -	11 12	12-14	9-11	Endeavour R., Australia, N. Coast.	8 0	5-10
Dumbarton, Scotland -	0 20	9		— Strait, Aus- tralia N. Coast.	1 0	9½
Dunbar, Scotland	2 8	14½	11	Endermo Harbour, Japan	5 30	6
— Hindoostan, W. Coast.	10 10	8		English Bank, San Carlos, Patagonia, W. Coast.	0 4	
Dunbeacon, Ireland -	3 51	10½	7½	English Harbour, Antigua		2
Duncansby Ness, Scot- land.	10 14	10	7	English R., Delagoa Bay, Africa, S. Coast.	7 30	5
Dundalk, Ireland -	10 56	13½	11½	Enora Bay, Japan Sea -		4
Dundee, Scotland -	2 32	14½	11½	Eran Bay, (Palawan) China Sea, E. Coast.	10 10	6½
Dungeness, England -	10 45	21½	19	Erebus Bay, Barrow Strt.	12 6	8
Dunk Island, Australia, E. Coast.	9 28	6-10		Erme River, Bigbury Bay, England.	5 40	16½
Dunkerque, France -	12 8	16½	13½	Erqui, France - -	5 59	33½
Dunkerron, Kenmare R., Ireland.	3 45	10½	8	Erronau or Futuna, S. Pacific.	7 24	4
Dunmanus Harb., Ireland	3 57	9½	7½	Escumenac, Pt., Gulf St. Lawrence.	4 10	4
Dunmore, Ireland -	5 27	12½	9½	Espirito Bay, Brazil -	3 0	4
Durnford Port, Africa, E. Coast.	4 45	12		Espirito Santo, C., Ma- gellan Strait.	8 30	36-42
Dusky Bay, New Zealand	11 15	10	8	Esquimalt, St. Juan de Fuca Strait.*	irr.	7-10
Dvina (Bar), White Sea		3½		Essington Port, Australia, N. Coast.	3 24	13
Dyer Id., Africa, S. Cst.	2 50	5		Estevan, San, Port, Pata- gonia, W. Coast.	0 15	5
Easdale Sound, Scotland	5 10	10-12		Etches Port, America, N.W. Coast.	1 15	9½
Easter Id., South Pacific	2 0			Evangelists, Patagonia, W. Coast.	1 0	5
East Cape, New Zealand	8 55	7		Exmouth, England -	6 21	12½
— Point, Prince Edward Island.	8 30	3½	2	Exuma, Bahamas -	7 20	2½
Ecrehous, France -	6 32	31	22½	Eyemouth, Scotland -	2 15	15½
Eddystone Pt., Australia, E. Coast.	9 39	7		Eyre Port, Australia S. C.	10 30	6
Eden Harbour, Patagonia, W. Coast.	12 30	5		Fair Isle, Shetlands -	11 0	5
Edgar Port, Falkland Is.	7 15	6		Fairy Port, Australia, S.C.		4
Edgartown, United States	12 16	2½	2	Falkland Sound (N. en- trance), Falkland Ids.	6 45	
Edina, Africa, W. Coast	5 50	4		— (S. entrance)	7 0	
Edmonstone, Id., Sherbro River, Africa.			8	Fall Harbour, Labrador -	6 40	3½
Egg Id. Lt., United States	9 4	7	5½	Falmouth, England -	4 57	16
— G. St. Lawrence	2 0	11	6	False Point, Bay of Bengal, W. Coast.	8 0	8
Egmont Bay, Prince Edward Island.	3 0	4	2	Famine Port, Magellan Strait.	12 0	6
— Port, Falkland Islands.	7 30	11		Fane Id., Plumper Sound, Oregon.	irr.	12
Eides Fiord, Færoe Ids.	11 0	9½	7½	Fannings Id., S. Pacific -		4
Elbe, Entrance, Germany	12 0	11		Fanny Hole, Mulroy Bay, Ireland.	6 17	9½
Elena Sta., Port, Pata- gonia, E. Coast.	4 0	17				
— Bay, Ecuador -	1 18	8				
Elizabeth Bay, Africa, S. W. Coast.		5-6				
Ellen Port, Islay -	5 0	5	4			
Ellenwoods Anchorage, Bay of Fundy.	9 54	13	10½			

\* May to October from Midnight to 3 am. November to April from Noon to 3 pm.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
annel, Canton	1 0	7½	5	Formosa Mt., Malacca Strt.	8 0	11	8½
a, E. Coast				Fort Dauphin, St. Domingo	7 0	5½	3½
outh, California	10 37	4½	3½	Fortune Bay, Patagonia,	0 50	7	
(close to the	11 48	11½	8½	W. Coast.			
way), England.				Foulness, Crouch River,	12 5	14½	10½
Bridge, Eng-	11 51	7½	4½	England.			
Cape, New	9 20	14	10	Fowey, England - -	5 14	15	11½
apan Sea -	6 0	5		Fowlers B., Australia, S.C.	10 30	6	
ores, Atlantic	11 45	4		Fox Bay, Falkland Ids. -	7 0	6	
				Foyle Lough (Warren-	6 20	6½	5
				point), Ireland.			
ape, River,	7 19	5½	4½	Foynes Island, Ireland -	5 35	15½	12
States.				France, Port de, New	8 25	4	
rance -	10 44	23½	18	Caledonia.			
ee Bay, Ireland	4 3	12½	9½	Francis, St., Bay, Tierra	4 0		
ry, Jura -	4 41	6½	4½	del Fuego.			
a, Clinch Fort,	7 53	6½	6½	Francisco, San (North	12 6	4½	34
States.				Beach), California.			
Voronha Island,	4 0	6		Fraser River (entrance),	6 30	7-10	
atic.				America, N. W. Coast.			
Po, Bight of	4 0	7		Fraserburgh, Scotland -	0 40	11	8½
				Frechette Id., River St.	8 0	14	9
ary Ids. -	12 30?	9?		Lawrence.			
ain -	3 0	15		Frederick Reef, Aus-	8 0	6	
, England -	4 20	16	12½	tralia, E. Coast.			
Cape, Spain -	3 0			Frederickshaab, Green-	6 3	12½	9½
G. Manan, Bay	11 16	22½	18½	land.			
y.				Friederichstadt, Denmark	2 37	9	
, Wales -	6 56	11½	8½	Frio Porto, Brazil -	2 40	4½	
Id., Australia,	9 15	7-12		Froward Cape, Magellan	1 0		
ort, Falkland I.	4 45	6		Strait.			
ay, St. Domingo	irr.	2-3?		Fugloe Fiord, Faroe Ids.	11 15	6½	4½
ugh Hd., England	4 30	16	12	Funchal Bay, Madeira -	12 48	7	
Port, Chile -	9 10	5		Funk Id., Newfoundland	7 0?	2-3?	
Ids., Bristol	6 54	37?	28?	Fury Cove, Patagonia, W.C.	1 15		
L.				— Harbour, Tierra del	2 30	4	
Port, England	11 12	26½	19½	Fuego.			
yre Light -	11 11	27	20½	Fury Id., Tierra del Fuego	2 30	4	
y, or Bay St.	3 30?	6?		Fury and Hecla Strait,	7 0	8	
frica, S. Coast.				Arctic Regions.			
is Harb., New-	7 15	2-4		Gaboon R., Africa, W.C.	5 30	3	
roup, Australia,	9 15	8-12		Galang Bay, Hainan Id.,		4-5	
it.				China Sea.			
Cape, United	8 34	1½	1½	Gallant Port, Magellan Str.	9 0	5½	
				Galle, Pointe de, Ceylon,	2 0	2	
Belgium - -	1 20	15		S. Coast.			
Hang-chu B.,	11 45	17		Gallegos Port, Patagonia,	8 50	46	
E. Coast.				E. Coast.			
Newfoundland	7 20	4		Gallinas R., Africa, W. C.	6 45	4	
, England -	11 7	20	16½	Galloway (Mull of) -	11 15	15?	12?
nt, Petitcoudiac	11 49	45	38	Galway, Ireland - -	4 35	14½	11
B. of Fundy.				Galveston, G. of Mexico		1½	½
ng Group (Bul-	8 30	17		Gambia R., Africa, W.C.	8 10	6-9	
urb.) China W.C.				Gambier Ids., Australia,	1 50	3	
River, Bight of	4 22	5		S. Coast.			
				Garliestown, Scotland,		17	12
hR., Africa, W.C.	7 40	11		W. Coast.			
oint, England -	10 35	28		Garroch Head - -	11 49	10	
				Gaspé Basin, Gulf St.	2 40	5	3
				Lawrence.			
				Gay Head, United States	7 37	7	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Geby, Fohou Id., Gilolo Passage, Moluccas.		5		Good Success Bay, Tierra del Fuego.	4 3	6-8	
Geelong Harbour, Australia, S. Coast.	2 50	2½		Goold Island, Australia, E. Coast.	6 45	6	
George Cape, Nova Scotia	9 15	4	2	Gooriya Creek (entrance), Hindoostan, W. Coast.	11 0	9	
George d'Elmina, St. Africa, W. Coast.	4 30	6		Goose Cove, Newfoundland.	7 0?	2-3?	
— Port, B. of Fundy	11 17	32	28	Gorda Sound, Virgin Ids.	8 30	1½	
— St., Basin, Australia, N. W. Coast.	12 15	25		Gore Port, New Zealand	9 0	8	6
— Shoals, United States.	10 30	7		Goree Road, Tierra del Fuego.	4 0	8	
Georges, St., Sound, G. of Mexico, Mid entrance.	1 31	1½	1½	Goulburn Ids., Australia, N. Coast.	6 0		
— West entrance	irr.	2½-4		Goury, France - -	7 6	22	17½
Georgetown, United States	8 40	4½	3½	Gowland Harbour, Discovery Passage, Vancouver Id.	5 30	11	
— South Island, United States.	7 56	4½	3½	Gracias, Cape, Harbour, Bay of Honduras.	10 30	2	
Geriah Harbour, Hindoostan, W. Coast.	2 40	9		Grand Cestos, Africa, W. Coast.	5 20	4	
Germain St., France -	6 20	34	25	— Harb., Gd. Manan, Bay of Fundy.	11 7	21	17½
Ghubbet Ne, Socotra, Indian Ocean.	7 0	7		— Lahou, Africa, W. Coast.	4 20	4	
— Hashish, Arabia, S.E. Coast.	10 0	10		Grand Passage, B. of Fundy.	10 43	20¾	17
Gibraltar, Spain - -	2 20	3½		Grand Port, Mauritius -	1 0	1½	
Gigba Sound, Scotland -	2 22	4	2½	— Rustico, Prince Edward Island.	6 40	4	2
Gijon Bay, Spain, N. Cst.	3 15	15		Grande-digue, Madame I., Cape Breton Id.	7 55	6½	4½
Gilmorris Id., Africa, W. Coast.	6 0	11		Grande Point, Chile -	9 45	5	
Gizree Bunder, Indus, Hindoostan, W. Coast.	9 50	7		Granton Pier, Scotland -	2 20	16	12½
Glasgow, Scotland - -	1 25	9	7½	Granville, France -	6 13	37	27½
— Port, Scotland -	0 18	9		Gravelines, France -	12 0	19	15
Glenan Iles, France -	3 12	13	10	Graves Port, Howe Sound, Gulf of Georgia,*	noon	12	
Glennie Ids., Bass Strait	12 20			America, N. W. Coast.			
Gloucester Cape, Tierra del Fuego.	1 30	5		Gravesend, England -	1 10	17½	14
— Harbour, United States.	11 4	10½	8½	Great Barrier, Id. (Nagle Cove), New Zealand.	6 25	10	7
Gluckstadt, Germany -	3 9	10		Great Barrier Reef, Australia, E. Coast.	8 48	7	
Goa, Hindoostan, W.C. -	11 30	6		Great Fish Bay, Africa, W. Coast.	2 30	5-6?	
Godbout River, Gulf St. Lawrence.	1 52	11	6	Great St. Lawrence Harb., Newfoundland.	8 30	7	4
Goeree (West Gat) -	1 45	7		Greatman Bay, Ireland	4 39	15½	11
Gollonsir Socotra, Ind. Ocean.	7 20	8		Green Island, River, St. Lawrence.	2 45	16	9
Golovnin Bay, America, N. W. Coast.	6 23	3½		Greencastle Point, Ireland.	11 2	14	11
Gomera, Canary Ids. -	12 45?	9?		Greenock, Scotland -	12 8	9½	8
Gometra, Loch Tuadh, I. of Mull.	5 29	11½	8	Greenwich, England -	1 43	19	15
Gonaives Bay, St. Domingo	8 0	1		Gregory Bay, Magellan Strait.	9 45	23	
Goods Bay, Patagonia, W. Coast.	0 30	7		Grenada (St. George Harb.), Caribbee Ids.	2 40	1½	
Good Hope, Cape of, China, E. Coast.	9 0						
Good News B., America, N. W. Coast.	6 15	13½					

\* From observations made in the month of October.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
adines, Caribbee Ids	3 0	1½	1	Harbour of Mercy, Magellan Strait.	1 22	4	
Port, Swan River,	9 0	1-1½		Harbour Grace, Newfoundland.	7 30?	7?	
ustralia, W. Coast				Harbour Id., Nova Scotia	7 40	6½	4½
town, Mosquito Cst.	9 0	1½		Hardy Port, New Zealand	9 55	8	6
unika Pt. White Sea	4 50	3		Harrington Port, England	11 5	26	19
th I., Barrow Strait	12 15	3½	2½	Hartlepool, England	3 28	15	11½
et Bays, Newfoundland.	7 0?	2-3?		Harwich, England	12 6	11½	9½
isbury, England	5 36	19½	15	Hastings, England	10 53	24	17½
istone Island, Bay of ndy.	11 47	41	34½	Harbour, Bay of Bengal, E. Coast.	10 40	13½	
iez Cape, France	11 27	21½	16½	Hatteras Inlet, United S.	7 4	2½	2
dine, R. St. Lawrence	9 0	9	6	Haute Isle, Bay of Fundy	11 21	33	28½
abacho Bay, Peru	6 30	2		Havana, Cuba		3	
may Bay, Peru	6 10	2		Haverfordwest, Wales	6 42	7½	2½
alco, Mexico, W. C.	1 30	5		Håvre, France	9 51	22	18
aguil, Ecuador	7 0	11		Hawke B., New Zealand	7 50	3	
mas, Mexico, W. C.	8 0	4		Héaux Lights, France	5 45	31	23½
nsey, (St. Peter rt.) English Channel.	6 37	26	18½	Heawadon Pholo Atoll, Maldives.	9 30	5	
Narrows, Patagonia,	2 10			Heda Bay, Japan Sea		5½	
. Coast.				Helena St., Bay, Africa, W. Coast.	2 30		
chos Kay, Bahamas	7 40	3		Id., S. Atlantic	3 11	3	
Cay, Bahamas	8 30	3		St. Sound, U. S.	7 8	7½	6
lavee R. (entrance), ndoostan, W. Coast.	2 0	19		Helford, England	4 43	15½	11½
leet Sand, England-laff Id., China, E. C.	11 40	12	8	Helgoland, German Ocean	11 33	9½	7
sborough, Nova otia.	8 20	6½	4½	Helier, St. Jersey, English Channel.	6 25	30½	21½
edore (Banbeg), Ire- id.	5 32	11	8	Hell Gate Approaches, United States.			
dem, Netherlands	9 0			Long Id., (Blackwells Dock).	9 59	6	5½
table Id., Lapland	7 9	9		N. of Astoria	9 48	6½	5½
tants Harb., C. Bre- m, Id.	8 20	6½	4½	Ferry.			
sun Bay, China, E. ast.	9 0			Pot Cove, (S.E. part).	10 48	8½	6½
i Cape, St. Domingo	6 0	3		Wards Id., (Paupers Dock).	10 9	6½	5
un-tau, (Thornton aven), Yellow Sea.	9 0	12		Hellevoetsluis, Netherlands.	2 30	8	6
luyt Head, Nova mbia.	1 30	4		Henlopen Cape, United States.	8 0	4½	
odadi Harb., Yezo land, Japan.	5 0	3		Henry Cape, United States	7 40	4	
fax, Nova Scotia	7 49	6	5	Henry Port, Patagonia, W. Coast.	12 0	5	
Bay, Patagonia, W. ast.	0 30	8		Heron Islet, Capricorn Group, Australia, E. C.	9 0	10	
burg, Germany	5 29	6½		Herradura Port, Chile	9 8	5	
ilton Port (Korea), llow Sea.	8 30	11		Nicoya Gulf	3 9	10	
merfest, Norway	1 10	9		Hewett Bay, Tierra del Fuego.	0 30	6½	
mond Knoll, Eng- id, E. Coast.	7 40			Heybridge, Blackwater, River, England.	12 20	12	8
s-chu Bay (Sesham s.), China, E. Coast.	11 45	14		Hie-chechin Bay, China, E. Coast.	7 0		
(Fog Ids.)	11 45	17		Hicks Bay, New Zealand	9 0	7	
(Chapoo Rd.)	12 0	25		Hierting, Jutland	2 45	5	
off Can-pu		32		Higbees, Cape May, United States.	8 33	6½	5½
ver Sound, Bahamas	8 15	4	3				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Spring.	Neaps.			Spring.	N
Hillsborough Bay, Prince Edward Id.	h. m. 10 45	ft. 9½	ft. 7	Hulushan B., Yellow Sea	h. m. 2 30	ft. 8	
Island (New Port), Bonin Islands.	11 32	3½		Humboldt Bay, California	12 2	5½	
Hillswick Firth, Shetland	9 45	6½	5	Hunter Id., Bass Strait	11 30	8	
Hilton Head, United States	7 19	7½	6½	Port, Australia, E. Coast.	9 45	6-7	
Hirtshals, Jutland	4 28	1		Hurst (Camber), England	{ 10 0 } { 12 0 }	{ 7½ }	
Hobartown, Tasmania	8 15	4½	3½	Husum, Denmark	- 2 36	9	
Hoe-e-tow Bay, China, E. Coast.	12 15	16		Hyannis, United States	- 12 22	4	
Hokianga R. (entrance), New Zealand.	9 45	10		Ichabo Id., Africa, W. C.	- 1 0	6	
Hokianga R. (Kokohu) New Zealand.	10 15	10	7	Ilfracombe, England	- 5 42	27½	1
Hollesley, England	11 30	8?	6?	Ilha Grande, Brazil	- 12 30	5	
Holmes Hole, United States.	11 43	1½	1½	Ilheo, Port d', Africa, W. Coast.	3 0	8-10	
Holsteinborg, Greenland	6 30	10		Iliolo Port, Filipinas	- 12 0	5½	
Holy Island, England	2 30	15	11½	Inagua, Bahamas	- 8 0	3½	
Holyhead, Wales	10 11	16	12½	Indefatigable Id., Galapagos.	- 1 56	6	
Hon-cohe Bay, China Sea, W. Coast.	11 30	5		Indian Cay, Florida	- 8 23	2½	
Hondenklip Bay, Africa, S.W. Coast.	2 30	5½		Indus (Gizree Bunder), Hindoostan, W. Coast.	- 9 50	7	
Honfleur, France	9 29	23½	18	Inhambane R., Africa, E.C.	- 4 15	10	
Honghai B., China, E. C.	10 0	6½		Inishbofin, Ireland	- 4 34	12½	
Honoruru, Sandwich Ids.	4 0	2		Inishkeel, Ireland	- 5 10	11	
Hongkong, China, E. C.	10 15	4½		Inishturk, Ireland, W. Coast.	- 4 36	12½	
Hoogly R., (W. entrance), Bay of Bengal, W. C.	10 0	10½		Inkanakie, White Sea	- 9 15	14	
Hope Harb., Falkland Ids.	8 10	7		Inman Cape, Tierra del Fuego.	- 2 0	4	
Horn Cape, Tierra del Fuego.	4 40	9		Intsi Point, White Sea	- 11 55	16	
Horn or Blaavand Point, Jutland.	1 44	5		Inverary, Scotland	- 12 0	10	
Horton Bluff, B. of Fundy	12 30	48	40	Inverness, Scotland	- 12 18	12	
Hougue Ia, France	8 42	18½	14½	Investigator Rd., Australia, N. Coast.	- 8 0	9	
Hourdel, France	11 26	27½	21	Iona Sound, Scotland	- 5 11	11½	
Hout B., Africa, W. Cst.	2 20	5		Ipswich, England	- 12 35	13½	
Houtman Rocks, Australia, N.W. Coast.	11 30	2½		United States	- 11 26	10½	
Howden, R. Tyne, England.		12		Iquiqui Road, Peru	- 8 45	5	
Howe, West Cape, Australia, S. Coast.	9 0	6		Ireland Id., Bermudas	- 7 4	4	
Howth Harbour Ireland	11 9	13	10	Isidro St., Cape, Magellan Strait	- 1 0	8	
Huacho Bay, Peru	4 45	3		Island Harbour, Choiseul Id., Falkland Islands.	- 5 20	6	
Huafu Islands Patagonia, W. Coast.	12 0	7		Islay, Peru	- 8 53	7	
Huapilinao Hd., Patagonia, W. Coast.	1 25	15½		Isle-aux-Coudres, R. St. Lawrence.	- 4 25	17	10
Huasco Port, Chile	8 30	6	4	Isles de Los, Africa, W. C.	- 6 35	13	
Huillard Inlet, Patagonia, W. Coast.	0 48	16-20		Isolette Cape, Arabia, S.E. Coast.	- 9 0	10	
Hu-i-tan Bay, China, E. Coast.	12 15	16		Ives, St., England	- 4 44	21	13
Hukkar R. (entrance), Hindoostan, W. Coast.	10 30	11		Jacinto, Port San, Ticao Id. Filipinas.	- 6 30	6	
Hull, England	6 29	20½	16½	Jackson Port (N. Head), Australia.	- 8 15		
Bridge, Crouch R., England.	12 25	16	11	Jaemel, St. Domingo	- irr.	2-3?	
				Jaffrabat, Hindoostan, W. Coast.	- 11 35	9	7½
				James Id. (Adam Cove), Galapagos.	- 2 14	5	
				N. side, Galapagos.	- 2 34	5	



ce.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
V. end, Gal-	3 10	5		Jura Island, (Small Isles), Scotland.	5 3	3½	2½
tyPoint)U.S.	2 11	3	2¾	—Feolin Ferry "	4 41	6½	4½
al, Persian	9 30	8		Kaikora Penin, New Zealand.	5 30	8	6
Persian Gulf	6 0	6		Kaipara Harb. (entrance), New Zealand.	10 55	10	8
y of Fundy	10 4	15	11½	Kalgalska, White Sea	6 50	7	
a Scotia -	7 45	6½	4½	Kalian Point, Banks Strait	8 17*	12½	
da., Lapland	6 23	10		Kandalaksha, White Sea	3 25	7	
terranian -	3 10	7	5	Kanushin Cape, White Sea	11 54	15	
, Brazil	11 30	12		Kapiti Island, New Zealand	9 0	6	
el), English	6 25	30½	21½	Karachi Harb. (entrance)	10 30	9½	6
annel.				Hindoostan, W. Coast.			
sel) -	6 15	30	21½	Karakoa Bay, Owyhee -	3 49		
Australia, E.	6 20	6-9		Kata, Japan Sea -	6 4	6½	
				Katwyk, Netherlands -	2 30	5	7
bí, Persian G.	6 30?			Kawau Id., New Zealand	6 30	10	
mar-al-nafur,	9 30	10		Kawhia Harb., New Zealand.	9 30	12	
ia, S.E. Coast							
Persian Gulf	11 30	10		Kedewarry, Hindoostan	9 57	9	
r " -		8½		Keelacarry, Ceylon -	11 0		
s " -	0 45	7½		Kedgerree, Bay of Bengal	11 30		
urg or Káreg "	8 0	6½		Keeling Islands (Port Refuge), Indian Ocean.	5 30	5	
ek " -	10 15			Kegashka B., G. St. Lawrence.	10 45	5	3
nb " -		8					
l Sea -		4		Kelung Harb. (Formosa), China Sea, E. Coast.	10 30	3	
, White Sea -	5 15			Kenmare R. (W. Cove), Ireland.	3 52	10	7½
razil -	6 24	14	10½	Kenn Reef, Australia, E. Coast.	8 0	5½	
, Comoro Ids.,	3 30	8½		Kennebec River (Hanniwells Point), U.S.	11 15	9½	8
que.				Kent Island, Bass Strait	11 10		
ay of Fundy -	11 21	27	23	Kentish Knock, England	11 47		
Newfoundland	7 30	6	4	Keppel Bay, Australia, E. Coast.	9 30	9-14	
liver, Africa,	4 0	5		Keret, White Sea -	3 8	6	
				—Point, White Sea	4 30	5½	
iver, U. S. -	7 28	5½	5	Kerguelen Island, Indian Ocean.	2 0	2	
Bay, Gulf of	10 0	6		Kesm, Persian Gulf -	11 0	12	
				Kettle Cove, United States	7 48	5	4½
, Africa, W.C.	8 10	6		Khór Jerámeh, Arabia, S.E. Coast.	9 30	10	
doostan, W.C.	2 0	16	12½	Kijouk Phyou Harbour, Bay of Bengal.	10 0	9	6
Port, Patagonia.	10 0	30	25	Kilbaha, Ireland -	4 16	13	9½
Island, New	9 30	6	3	Kilda, St., Hebrides -	5 30		
sk.				Kildin Id., Lapland -	6 45	12	
ra, Madagascar		5		Kilkieran Cove, Ireland -	4 34	15½	11
ndez L, Chile	9 30	4		Killala Bay, Ireland -	5 22	10½	8
Porto Rico -	8 2	1½		Killeany Bay, Arran Ids., Ireland.	4 28	13½	10
Port, Peru -	5 10	3		Killingholme (Humber R.), England.	6 2	19½	15½
Africa -		8		Killybegs, Ireland -	5 16	11½	8½
t, United States		3½	3½	Killyleagh, Ireland -	12 40	11	9½
Lapland -	9 0	13					
t, Port, Pata-	10 45	30					
Coast.							
b, Greenland -	5 6	7	5				
t., Harbour, }	7 21 A.M.	4½	3				
land.	6 30 P.M.	6½					
entrance, Can-	11 50						
ter, China.							
r, Africa, W. C.	5 45	5					
Id. (E. Side),	10 0	11½					
Strait.							

\* In N.W. monsoon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	N.
Kilmichael Point, Ireland	h. m. 8 30	ft. 4½	ft. 3	Lagos River (Consulate Wharf.)	h. m.	ft. 2	
Kilrush, Ireland	4 42	14	10½	——— (Palaver Ids.)		1	
Kincardine, Firth of Forth, Scotland.	2 53	17½	15	Laguimanoc Port, Luzon	1 30	5½	
King Id., Bass Strait	1 0			Laguna de Terminos, G. of Mexico.	noon.	1½	
King Port, Falkland Ids.	7 30	5		Lamalin, Newfoundland	9 15	8½	
Kingsbridge, England	5 46	10		Lambayeque Rd., Peru	4 0	3	
Kingstown, Ireland	11 10	11	8½	Lamlash, Scotland	11 49	10	
Kinsale, Ireland	4 43	11½	9	Lamo Harb., Africa, E. Coast.	4 6	11	
Kinsiang Point, China, E. Coast.	7 0			Lancaster, England	11 16	8½	
Kircubbin, Ireland	12 42	11½	9½	Landshipping, Cleddau River, Wales.	6 27	20	1
Kirindi, Ceylon	3 30			Langshan Crossing, Yang-tse-Kiang.*	1 40	12	
Kirkcudbright, Scotland	11 10	23		Lankeet Island, Canton River, China.	11 20	6½	
Kirkwall, Orkneys	10 9	10	7½	Lansew Bay, China, E.C.	10 0	13	
Kishm, <i>see</i> Kasm.				Lanzarote, Canary Ids.	1 0?	9?	
Kitnapatnam, Bay of Bengal, W. Coast.	11 0	1½		Laredo B, Magellan Str.	11 30	9	
Knox Bay, America, N. W. Coast.		11		Larga, Scotland	11 50	10	
Koepang, Timor	11 0	9	6½	Latham Id., Africa, E. Cst.	4 0	10	
Kokohu, New Zealand	10 15	10	7	Latitude Bay, Tierra del Fuego.	2 5	4	
Ko-kun-to Group, Korea, W. C.	2 25	18	10	Laun, Great and Little, Newfoundland.	8 15	7	
Kok-si-kon Prt. (Formosa) China Sea, E. Coast.	11 30	3		Laura Harb., Tierra del Fuego.	1 0	6	
Koombanah B., Australia, W. Coast.	9 0	½-3		Lavata Cove, Chile	9 20	5	
Koree R. (Monda Point), Hindoostan, W. Coast.	11 40	11		Lawrence, Great St., Harb. Newfoundland.	8 30	7	4
Kouloi River	1 15	20		Le Have Cape, Nova Scotia.	7 48	7	2
Kou Zomen, White Sea	3 30	6		——— Nova Scotia, Crooked Channel.	7 51	7½	1
Kovda Bay, White Sea	3 25	6		——— Mothers Island	7 51	7	3
Koweit, Persian Gulf	0 15	9		——— Getsons Cove	7 55	7½	6
Krakatoa, Strait of Sunda	7 0	4		——— Bridgewater (McKean's Wharf.)	8 6	8	6
Kuper Port, America, N. W. Coast.	1 40	13	10½	——— Lunenburg (Spidlers Cove.)	7 54	7½	6
Kuriyán Muriyán Bay and Islands, Arabia, S.E. Coast.	8 20	6½		Le Maire Strait, Tierra del Fuego.	4 0	7	
Kurrachee, <i>see</i> Karachi.				Leervig Fiord, Færoe Ids.	0 30	6½	4
Kwshan Ids., China, E. Coast.	9 30	14		Leith, Scotland	2 17	16½	12
Kyem River, White Sea	5 23	4		Leman Shoal, England, E. Coast.	6 0		
Kykduin, Netherlands	7 0	12		Lennox Cove, Tierra del Fuego.	4 40	8	
Kyle Akin, Loch Alsh, Scotland.	6 16	15½	11	Leopold Port, Barrow Str.	12 6	6	4
Kyle Rhea, Scotland	6 0	15	11	Lepreau, Bay of Fundy	11 18	24½	21
La Poile Bay, Newfoundland.	9 0	6	4	Lerwick, Shetland	10 30	6	4
Labuan Id., China Sea, E. Coast.	9 45	6		L'Etang Harb., Bay of Fundy.	11 19	23½	20
Labyrinth Ids., Magellan Strait.	0 30	5½		Leubu River, Chile	10 30	5	
Lacl Harb., St. Domingo	6 0?	3?		Leven Port, Madagascar	3 30	7½	
Lady Bay, Australia, S.C.		4		Levriar Bay Africa, W. Coast.	12 0	6-7	
Lady Elliot Islet, Australia, E. Coast.	9 0	7-8		Lewis Cape, St. Labrador	6 30		
Lagos, Portugal	2 7	13					
——— River (Bar), Bight of Benin.	6 0	3					

\* At the Langshan Crossing the tide rises for 3 hours only, and falls for 9 hours.—H.M.S. Acton, 1861.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Cape (G. of Siam), na Sea, W. Coast.	5 7	6½		Loch Eil (Head of Loch)	6 27		
Ho (Bar), Yellow Sea.	4 0	11		— Eport „	6 6	12½	9½
— (entrance)	5 0	12		— Eriboll „	7 43	14½	11
ung Gulf (Sand nt), Yellow Sea.	4 50	7	5¾	— Erisort „	6 43	15½	11½
— N.W. Head of f.	5 30	10	8¾	— Etive, Stonefield „	7 3		
ick, Ireland	6 16	18½	13¾	— Bunawe „	7 54	5¾	
River (entrance), ica, E. Coast.	4 15	12		— Ewe „	6 39	14½	10½
a, Persian Gulf	12 0?			— Goil „	12 6	10	6
Island, Canton R. na, E. Coast.	12 0	7½		— Hourn „	5 45	13¾	10½
(Belem), Portugal	2 30	12	9	— Inver „	6 41	14	11
or Bay, Ireland	4 23	13¾	10	— Laxford „	6 44	15	11½
ab Harb., Nova ia.	8 0	6½	4½	— Linnhe „	5 26	12½	8½
Bay, China, E. C.	10 15	16		— Long „	12 6	12	
enmark	2 21	6		— Maddy „	6 6	12½	9½
Ridge, White Sea	11 45	15		— Moidart „	5 44	13¾	9½
Egg Harbour, ed States	7 10	4½	3½	— Nevis „	5 47	14½	10
Fish Bay, Africa, Coast.	2 30	5-6?		— Roag „	6 11	11	8
Gull Island, U. S. - ampton, England	9 38	3	2¾	— Ryan „	11 12	11	
Metis, G. St. Law- e.	2 10	13	8	— Strivan „	11 55	6	
Milford Quay, r Cleddau, Wales.	6 31	19	13½	— Sunart „			
Natashquan, G. Lawrence.	11 0	5	3	— Tarbert, West, Har- ris Island, Scotland.	6 4	11½	8½
ool, England	11 23	26	20½	— Tarbert, East, Scot- land.	6 10	13½	10
— Bay, Nova ia.	7 50	8	5	— Tongue „	7 53	15	12
ay, Lapland	5 58	9		— Torridon „	6 20	15	11
Id., Australia, E. t.	9 15	7-10		— Tuadh „	5 29	11½	8
Point, (Perran : Cove), England.	5 0	14½	10½	Lofoten Ids., Norway	12 0	9	7½
y (Bar), Wales	6 16	28	21	Loheia, Red Sea	1 30	3	
Port, Bonin Ids.	6 8	3		Loire R. (St. Nazaire), France.	3 40	15½	11
San Paul de, a, W. Coast.	4 30	5		Lomas Point, Peru	8 19	5	
Point, Banka Strt.*	11 0½	10		Lombock, (AmpanamB.), Java Sea	8 0	6	
B., Africa, S.W. t.	2 20	5		London Bridge, England	2 7	19½	16½
oint, Peru	8 0			— Docks, England	1 57	19½	17
ay, Bahamas	7 40	3		Londonderry, Ireland	8 1	7½	5½
Head, Patagonia, east.	0 29			Loe (East), England	5 26	16	13
line, Scotland	5 33	13¾	10½	Lookout Point, United S.	0 58	2	1½
ish „	6 16	15½	11	Lopez Cape, Africa	4 30	4-6?	
iadale „	5 47	12½	9½	L'Orient (Port Louis), France.	3 11	13	9½
oom „	6 40	14½	10½	Lord Howe Island, S. Pacific.	8 30	6	
rron „	6 29	16½	11½	Lo-shan-kan, Yellow Sea	4 30	11	9
rich „	6 0	15½	11	Lough Larne, Ireland	10 48	6¾	6½
invegan „	6 7	15½	11	— Rossmore, Ireland	5 20	11	8
				Louis Port, France	3 11	13	9½
				— Mauritius	12 30	3	2½
				Louis, St., Bay, St. Do- mingo.	irr.	2-3?	
				Louisburg Harb., Cape Breton Id.	8 0	5	4
				Low Bay, Falkland Ids.	5 0	5½	
				— Port, Patagonia, W. Coast.	0 40	7	
				Lowestoft, England	9 57	6½	5½
				Luabo River (entrance), Africa, E. Coast.		22	
				Lucas San, Bay, California	9 20	9½	

\* In S.E. monsoon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Ri
		Springs.	Neaps.			
	h. m.	ft.	ft.		h. m.	ft.
Lucipara Pass, Banka Strait.	irr.	10	7½	Malacca Strait (off Mount Formosa).	8 0	11
Luis St., Texas, G. of Mexico.		1½	¾	— Road, Malacca St.	7 30	11
Luis Obispo, San, California	10 8	4½	3½	Malaga, Spain - -	12 0	3
Lunaire Bay, Newfoundland.	7 0?	2-3?		Malahide Inlet, Ireland	11 15	10
Lundy Island, England -	5 15	27	20	Malcolm Atoll, Maldives	10 30	3
Lung-mun Harbour, Yellow Sea.	10 0	7		Maldon, Chelmer River, England.	12 32	10
Lyme Regis, England -	6 21	11½	8½	Male, Maldives - -	12 30	3
Lymington England -	{ 10 25 12 15 }	8	6	Malludu Bay, Borneo -	10 30	6-8
Lynn Deep, England -	6 0	23		Malo, St., France -	6 5	35
— Harbour „ -		18		Malpelo Point, Peru -	4 0	10
— Road „ -		20		Man-of-War Cay, Bahamas.	8 10	4
Mabou River, C. Breton Id.	9 0	4		Manas Island, New Zealand	7 0	8
Macahé, Brazil - -	2 30	9½		Manama, Persian Gulf -	5 20	7
Macao, China, E. Coast -	10 0	6½		Manawatu River, New Zealand.	10 0	8
Macassar, Celebes -	4 40	5½		Mancenilla Bay, St. Domingo.	7 0	4-5
McDougall Harb., Africa, S.W. Coast.	2 30	5½		Mandavee Roads, Hindoostan, W. Coast.	11 50	15
Maceio, Brazil - -	4 30	8½		Mangalaum Id., China Sea, E. Coast.	11 0	5
Machias, Seal Id., Bay of Fundy.	11 5	18	14½	Manicouagon River, R. St. Lawrence.	2 15	12
Macowa, Red Sea -	0 30	2		Manila (Luzon Island), China Sea, E. Coast.	10 40	2½
Macquarie Harbour, Tasmania.	7 30	3		Manning River, Australia E. Coast.	10 0	
— Port, Australia, E. Coast.	8 56	4-5		Manora P., Karachi, Hindoostan, W. Coast.	10 30	9½
Macquereau P., G. St. Lawrence.	2 0	5	3	Manorah R., Hindoostan, W. Coast.	1 30	16
Madame Id., Madagascar	4 0	5		Manta Port, Ecuador -	3 4	6
Madoc Port, Wales -	7 30	17		Manukau Har. (entrance), New Zealand.	9 30	13
Madras Road, Coromandel Coast.	7 34	3½		Manybranch Harb., Falkland Ids.	7 40	7½
Magadoxa, Africa, E. Cst.	4 30	8		Maplin Light (Thames), England.	12 5	14½
Magdalen Ids., G. St. Lawrence.	8 20	3	2	Maquereau Point, G. of St. Lawrence.	2 0	5
Magdalena Sta., Island, Magellan Strait.	12 0	10		Maranham, Brazil -	7 0	17½
Magdalene B., California	7 35	6½		Marblehead, United States	11 30	19
Mahato Id., Africa, E. C.	4 30	7		March Harb., Tierra del Fuego.	3 10	6
Mahneah R., Africa, W. C.	7 40	11		Marcouf, St., France -	9 55	20
Mahone Bay, Nova Scotia	8 0	7		Mare Harb., Falkland Ids.	6 0	6
Mahons R., United States	9 52	7	5½	Margate, England -	11 40	15½
Malden Rocks, Ireland, N.E. Coast.	10 43	6½	6½	Maria Sta., Id., Chile -	10 20	6
Majambo B., Madagascar	4 30	16		Maria Van Diemen Cape, New Zealand.	8 0	7
Makátein, Arabia, S.E. Coast.	9 0	6		Maristow, River Tavy, England.	5 47	8½
Makalleh, Arabia, S.E. Coast.	8 30	7		Marjoribanks Harbour, Korea, W. C.	3 30	29
Makumba R., Madagascar	4 45	17		Mark, St., Bay of, St. Domingo.	8 0?	17
Makung Harb., Pescadores, China Sea.	10 30	9½	7	Marks, St., United States	1 14	3
Malabrigo Port, Peru -	5 0	2				
Malacca Strait (light vessel one fathom bank).	6 0	15	12			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ver, Guayana	5 30	8	6	Mergui, Bay of Bengal,	10 30	18	
Bay of Bengal	2 20	21		E. Coast.			
Cove, Tierra	3 30			Merigomish, Nova Scotia	10 6	5½	3½
o.				Merjee R., Hindoostan,	11 0	7	
— C. Horn	3 50	8		W. Coast.			
rra del Fuego.				Merville, France -	9 36	21	17½
de la Arena,	3 30	15		Metway Port, Nova Scotia	7 50	8	5
. Coast.				Mevagizey, England -	5 4	15½	12
Rocks, South	3 45			Mexillones Port, Bolivia	10 32	3	
pe St., New-	8 30	7	5	Mezen, White Sea -	1 48	15-22	
d.				Miau-tau, (Depôt Bay),	10 35	6	
Harb., Mada-	4 0	5		Yellow Sea.			
. Coast.				Miaveness, Farøe Islands	3 12	6½	4½
foundland -	7 40	7½	5	Michael, St., Azores -	12 30	6	
St. I. of Man	11 10	20	16	Michael Seymour Port,	5 30	3	
Scilly Is. -	4 27	16	12	Gulf of Tartary.			
England -	11 3	18	13	Middle Cove, Tierra del	3 30		
rsian Gulf -	11 15	6		Fuego.			
New Zealand -	11 10	8	6	Middle Island, Patagonia,	12 0		
Bay (Tasman	8 45	13	9	W. Coast.			
New Zealand.				Middlesbrough, R. Tees,	3 55	13	
ay, Motu Pipi	9 50	14	10	England.			
ew Zealand.				Middleton R., Bight of	4 15	5	
Red Sea -	1 0	3		Benin.			
ver, G. St.	2 15	11	7	Milford Haven (St. Ann	5 56	24	18
e.				Lighthouse), Wales.			
er, Chile -	10 0			Milford Sound, New Zea-	9 15	8	6
Bay of Bengal,	2 0	22	17	land, Mid. Island.			
(Port Louis) -	12 30	3	2½	Millman Island, Palawan,	10 27	2½	
Grand Port) -	1 0	1½		W. Coast.			
United States	8 19	6	5	Millport, Cumbrae Island,	11 50	10	6
ay, Palawan -	9 55	3½		Scotland.			
Indian Ocean	4 0	6½		Min R. (Temple Point),	10 45	19	14½
, Mozambique	4 10	11½		China, E. Coast.			
Africa, S.W.C.		7		Min R. (Losing Island),	12 0		
Port, Mada-	4 30	15		China, E. Coast.			
				Mindanao, Filipinas -	7 0	6	
Mexico, W. Cst.	9 40	7		Minehead, England -	6 30	35	26½
und, China, E.C.	12 30	17		Mingan Harbour, Gulf	1 16	6	4
Australia, S.C.	1 20	3		St. Lawrence.			
, Africa, E. C.	4 15	11		Minganld., G. St. Lawrence	1 30	6	4
R., Africa,	7 40	11		Minimegash, Prince Ed-	3 30	5	3
st.				ward Island.			
ef (Sand Cay),	7 55	5-6		Minow Islands, Mada-	5 0	15	
a, E. Coast.				gascar, W. Coast.			
eland -	6 1	18½	15½	Minquiers Rocks, France	6 6	35	26
Patagonia, E.C.	3 40	15		Miramichi (Bar), Gulf	5 30	5	3
Rock, Ba-	7 50	3		St. Lawrence.			
Bay, C. Breton	8 15	5½		Mira-por-vos, Bahamas -	9 30	3	2½
				Mirs Bay (Tide Cove),	10 0	6½	
er, (Paknam),	5 7	9½		China, E. Coast.			
ea, W. Coast.				Miscou, G. of St. Law-	2 30	5	3
Bight, U.S. -	7 45	4	2½	rence.			
ld., S.E. end,	6 0	4		Mississippi, S. W. Pass,		1½	
				Gulf of Mexico.			
rabia, S.E. Cat.	9 0	6½		Mistanoque, Labrador -	10 30	6	3
r, Banks Land		2		Mistley Quay, Stour R.,	0 48	11½	
ay, New Zea-	7 21	7	5	England.			
				Mobile, Gulf of Mexico	irr.	1-2	
				Mocha Island, Chile -	10 30		

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	R
		Springs.	Ncaps.			
	h. m.	ft.	ft.		h. m.	ft.
Mocha Road, Red Sea, (E. Coast).	12 0	4 $\frac{1}{2}$		Mutlah (Muda Kali), Bay of Bengal, West Coast.	11 45	15
Mogador, Africa, W. Cst.	1 18	10-12		Mutton Island, Ireland, W. Coast.	4 20	13 $\frac{1}{2}$
Molyneux Bay, New Zealand.	3 0	8	6	Myggenæs Fiord, Færoe Islands.	9 0	9 $\frac{1}{2}$
Mombaza Port, Africa, E. Coast.	4 0	11		Naafe R., Bay of Bengal, E. Coast.	10 0	
Monach Ids., Scotland, W. Coast.	5 44	12 $\frac{1}{2}$	8 $\frac{1}{2}$	Nanloe Fiord, Færoe Islands.	4 0	6 $\frac{1}{2}$
Monckton (Railway), Bay of Fundy.	0 15	47	37 $\frac{1}{2}$	Nafa-Kiang, Loo Choo Islands.	6 28	7
Mondego (Bar), Portugal	2 30	7		Nagasaki Bay, Japan Sea.	7 15	9
Monganui Harb., New Zealand.	8 15	9	7	Nagore, Bay of Bengal, W. Coast.	8 15	
Monomoy, United States	11 30	5 $\frac{1}{2}$	4	Namki Ids., China, East Coast.	8 30	17
Monrovia, Africa, W. C.	6 0	6		Namoa Island (Clipper Road), China, E. Coast.	11 15	7
Montauk Pt., United States.	8 20	2 $\frac{1}{2}$	2	Namquan Harb., China, E. Coast.	10 0	17
Monterey, California -	10 22	4 $\frac{1}{2}$	3 $\frac{1}{2}$	Nanaimo Harb., Gulf of Georgia, Vancouver Id.	5 0	14
Montrose, Scotland -	1 25	13	10	Nancowry Harb., Nicobar Islands.	9 15	8 $\frac{1}{2}$
Monts, Point de, Gulf St. Lawrence.	12 0	12	6	Nangamessie Harbour, Sumba.	11 30	17
Moreno (Constitucion Road), Peru.	10 0	4		Nangka Id., Banka Strait		12
Moreton Bay, Australia, E. Coast.	9 30	3-7		Nanoose Harbour, Vancouver Id.	5 0	15
Morewellham, R. Tamar, England.	6 12	10 $\frac{1}{2}$	6 $\frac{1}{2}$	Nansaree River (Bar), Hindoostan, W. Coast.	3 0	18
Morjovets Id., White Sea	11 20	17		Nantucket, United States	12 24	3 $\frac{1}{2}$
Morlaix Road, France -	4 53	24	18	Napoleon Road, Gulf of Tartary.	2 30	2 $\frac{1}{2}$
Morro (Sandy Pt.), Ecuador.	5 0	11		Narrinda Bay, Madagascar, W. Coast.	4 30	15
Mossel B., Africa, S. Coast.	3 30	6		Narrows (First), Magellan Strait.	9 0	36-42
Moudinga Id., White Sea	5 50	3 $\frac{1}{2}$		— (Second), Magellan Strait.	10 0	23
Mount Desert Island, United States.	11 10	13		Naruto (Fukura) Japan Sea.	6 17	7
Mourondava, Madagascar, W. Coast.	4 45	12		Nash Point, Bristol Channel.	6 25	33
Mouton Port, Nova Scotia	7 54	7 $\frac{1}{2}$	5 $\frac{1}{2}$	Nassau, New Providence, Bahamas.	7 30	4
Moville, Ireland -	7 6	7 $\frac{1}{2}$	5 $\frac{1}{2}$	Nassau Bay, Tierra del Fuego.	4 0	6
Mozambique Har., Africa, E. Coast.	4 15	12		Natal Port, Africa, S. C.	4 30	6
Mucaras Reef, Bahamas	7 40	3		Navallo Port, France -	3 42	13
Mugeres Harb. Bay of Honduras.	9 30	1 $\frac{1}{2}$		Nazaire, St., France -	3 40	15 $\frac{1}{2}$
Mull of Cantyre, Scotland	10 35	4		Naze, The, England -	12 6	12 $\frac{1}{2}$
Mulroy Bay (Bar), Ireland	5 40	11 $\frac{1}{2}$	8	Nee-ah Harbour, Oregon	12 33	7 $\frac{1}{2}$
Mumbles Lt. House, Wales	6 1	27 $\frac{1}{2}$	20 $\frac{1}{2}$	Needles Point, England -	9 46	7 $\frac{1}{2}$
Mungullo or Mongallo R., Africa, E. Coast.	4 45	12		Negapatam, B. of Bengal	5 0	3
Murdounah Id. (E. Cst.), Red Sea.	6 0	3		Negro Harbour, Nova Scotia.	8 12	7
Murray Islands, Torres Strait.	9 30	10				
Murray Pass, Bass Strait	11 10	8				
Musa Port, Babuyan Ids.		5				
Mutlah River, (entrance to Biddah River), Bay of Bengal, W. Coast.	10 0	14				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
er, Patagonia	11 0	14		Noamh Island, Scotland	5 2	11½	7
ew Zealand -	9 50	14	10	Noel, Bay of Fundy -	12 41	50½	43½
ort, Gulf St.	2 10	13	8	Noir Island, Tierra del	2 30	5	
ce.				Fuego.			
—, River St.	8 30	14	9	Noirmoutier, France -	3 2	16	11½
ce.				Nolloth Port, Africa,	2 30	5½	
ord (entrance),	7 57	4½	4	S.W. Coast.			
States.				Norderney, Germany -	10 30	8	
e, United States	11 53	7	6½	Nore, England -	12 30	15½	13
n, United States	11 16	6½	5½	Norfolk Island, S. Pacific	7 45	7	
ndon, United	9 28	3	2½	North Cape, C. Breton Id.	8 0	4	
				— Edisto River,	7 10	7	5½
vidence, S. W	7 30	4		United States.			
amas.				North Harbour, New-	8 0	7½	5
helle, United	11 22	8½	7½	foundland.			
				Sands, Malacca	5 30	15	12
Ireland -	6 4	12½	10	Strait.			
Sound, Tierra	3 30			Noss Island, Madagascar	5 0	15	
so.				Nova Zembla Harbour,	6 36	10	
, United States	8 13	5½	4½	Lapland.			
ort, United States	11 22	9	7½	Nuevo Gulf, Patagonia,	7 0	10	
Australia, E.	9 45	6-7		E. Coast.			
				Port, Central	3 10	12	
England -	4 23	10½		America.			
Ireland -	10 30	16	12	Nukulan Port, Fijii Ids.	6 47	5½	
, England -	11 51	20	15	Nunez River, Africa,	10 0	15	11½
United States -	7 45	4½	4	Nyminde Gab, Jutland -	2 41	2	
Wales, (South	7 10	39	29	Nysna Harbour, Africa,	3 45	5	
				S. Coast.			
— (W. C.)	7 0	12	9	Oban, Scotland -	5 22	12	9½
, Wales -	7 30	15		Obb of Harris, Isle of	6 16	11½	8½
Stewart, Scot-	12 0	12	6	Harris, Scotland.			
. Coast.*				Observatory Id., China	11 0	5½	
Bay, China,	8 30	5½		Sea, E. Coast.			
st.				Ocracocke Inlet, United	7 4	2½	2
St., Harb., G.	1 55	12	7	States.			
rence.				Octavia Bay, New	3 30	13	
— Port, Peru	5 15	3		Granada.			
Port (Lambton	4 30	5	3	Oclar Cape, Banka Strait	6 30	12	
) New Zealand,				Oibo Harb., Africa, E.C.	4 15	6	
d. (Nancowry	9 15	8½		Olaveaga, Bilbao River,	3 15	12	
Indian Ocean.				Spain.			
t., Bay, Ma-	2 6			Old Pt., Comfort, United	8 17	3	2½
trait.				States.			
elf (Port Her-	3 9	10		Old Providence, Bay of	irr.	1	
Cent. America.				Honduras.			
Belgium -	12 18	16	13	Olenji Islands, Lapland -	7 30	12	
p, Netherlands	7 27	4	3½	Oleron, Ile d', France -	3 50	19	
er (Nun en-	4 8	6		Omaider Island (Gulf of	6 0	4	
Africa, W. Coast.				Akabah), Red Sea.			
Chan., White	5 25	3		Omersary R., Hindoostan,	1 45	18	
				W. Coast.			
For., White Sea	6 0	2		Omonville, France -	7 29	15½	12½
Sound, China,	10 30	20		'Om-rasas-Masirah,	10 0	10	
				Arabia, S.E. Coast.			
roup, China E.	10 0	5		One Fathom Bank Light,	6 0	15	12
				Malacca Strait.			
Yung River,	1 0	9		Onega River, White Sea	9 17	6-7	
. Coast.				Oolooogan Bay, China Sea,	9 30	5½	
America, N.W.	6 0	18	15	E. Coast.			

\* At Carty Quay.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Oonting Port, Loo Choo Islands.	h. m. 6 35	ft. 8	ft.	Pancol, China Sea, E.C.	h. m. 9 40	ft. 6	
Oōsima, Japan Sea -	6 50	5		Pansand Hole, England -	12 0	15½	1
Oporto, Portugal -	2 30	10		Paposo, Chile -	9 40	5	
Orange B., T. del Fuego	3 30	5		Paquique Cape, Bolivia -	9 45		
— Cape, Magellan Strt.	3 0			Para, Brazil, N. Coast -	12 0	11	
Orford Haven (Bar), England.	11 30	7½		Parahayba, Brazil -	5 0	9-12	
— Port, California -	11 26	6¾	4¾	Parenga-renga Harbour, New Zealand.	7 54	7	
— Quay, England -	12 30	7½		Parida Id., New Granada	3 15	10½	
Orfordness, England -	11 15	8	6½	Parsboro, Bay of Fundy	12 17	43	3
Orinoco River (entr.) Guayana.	6 0	3		Pasado Cape, Ecuador -	3 30	10	
Orleans Id., R. St. Lawrence.	5 40	17	13	Pasages Port, Spain -	3 0	12	
Ormond, Kenmare River, Ireland.	3 43	10	7½	Passage or Culebra P., Caribbean Sea.	9 0	1	
Ormsay, I. of Skye -	5 50	14¾	10¾	— Id., Banda Sea -	noon	6	
Orlov Letni C., White Sea.	5 18	4		Passandava Bay, Madagascar, W. Coast.	5 0	15	
Os Ilheos, Brazil -	4 30			Patapsco R. (Bodkin Pt.) United States.	5 42	1½	
Osaki, Japan Sea -	5 55	6½		Patersons Inlet, New Zealand.	1 10	8	
Oscuro Cove, Patagonia, W. Coast.	0 55	20		Patrick Port, Scotland -	11 10	15	1
Osprey Reef, Australia, E. Coast.	8 36	6		Patta B., Africa, E. Cst.	4 30	10	
Ostend, Belgium -	12 25	19	15	Paul de Loanda, San, Africa, S.W. Coast.	4 30	5	
Otago Har., New Zealand	2 50	7	5	Paul St. Id., Indian Ocean	11 0	3	
Otaheite, South Pacific -	noon	1½		— G. St. Lawrence	8 0	5	
Otterswick, Orkneys -	9 13	11	8	Paumben Pass, Bay of Bengal, W. Coast.	1 30	2	
Otway Port Patagonia, W. Coast.	11 37	6		Payta Port, Peru -	3 20	3	
Ounalashka Id., America, N.W. Coast.	7 30	7½		Peckett Har., Magla. Strt.	12 0	6	
Ouro R., Africa, W. Cst.	12 0	8-9		Pedro Gonzales, New Granada, (Trapichi Island).	3 50	16	
Ouse, R. (Goole), England	7 44	14		Pedro San., Pass, Patagonia, W. Coast.	0 30	9	
Ower Shoal, England, E. Coast.	6 30			— San Bay, California	9 39	4¾	
Oxbaasheia, Norway -	12 0	8		Peel, Isle of Man -	11 8	16½	1
Oyster Bay, United States	11 7	9½	8	Pegasus Port, New Zealand	11 50	8	
Oystreham, France -	9 38	21	16	Pel-ho or Peking River, (entrance), Yellow Sea.*	3 10	10	8-
Packsaddle Bay, Tierra del Fuego.	3 30	6		— (Tien-tsin)		4½	
Padstow, England -	5 13	20½	16½	Pelew Islands, N. Pacific		6	
Pagham (entrance), England.	11 30	16½	12½	Pelican Lagoon, Kangaroo Id., Australia.	5 0	6	
Paimpol, France -	6 0	31	23½	Pelorus Sound, New Zealand.	9 35	11	7
Palais, Port le, Belle Ile, France.	3 18	14½	10½	Pemba Channel, Mozambique.	4 0	11	
Palliser Cape, New Zealand	6 0	6		— Id., Mozambique	4 15	12	
Palma, Canary Ids. -	12 30?	9?		Pembroke Dockyard, Wales.	6 12	21	15½
Palmas Cape, Africa, W. Coast.	4 30	4		Penang, Malacca Strait -	12 0	9	7½
Palmedo Road, Sumba Id.		15		Peñas Cape, Tierra del Fuego.	6 2	12	
Palmeira Point, Ceylon -	9 30	7-11		Pender Harb., Strait of Georgia, America, N.W. Coast.†	6 0	12	14
Paloan Bay, Mindoro -		5		Peniche, Portugal -	1 54		
Pamarung Ids., Borneo, E. Coast.		8-10		Penmark Rocks, France	3 16		
Pampang Bay, Java -		7-8					
Panama Road, Central America.	3 23	15-22	10-16				

\* Time and rise much affected by winds.

† From observations made in the month of October.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
R., Bight of	4 15	5		Pillar C., Magellan Strt.	1 0		
G. of Mexico		1½		— Cape, Tasmania -	1 0	6	
R. Tamar,	5 55	13½	9½	Pillars, R. St. Lawrence	5 0	17	10
irth, Stroma,	9 47	9	6½	Pinas Bay, New Granada	3 15	14	
S. Side.				Pinmill, Orwell River,	12 20	12	
wons, E. Side	10 24			England.			
— W. Side	9 35			Pio Quinto Port, Babu-	6 0	6	
reat Skerry,	11 4	9½	6	yan Islands.			
E. Side.				Pisco Bay, Peru -	4 50	4	
— W. Side	10 53			Piti Palena, Patagonia,	12 23	10	
England -	4 30	16½	12½	W. Coast.			
, Middle or	10 30	16	13	Pitty, Hindoostan, W. C.	10 5	9	
South or	10 30	14		Placentia, Newfoundland	9 15	8	
et, Australia,				Playa Marie Bay, Cali-			
G. of Aden -	12 0	7		ifornia.	9 20?	7-9?	
, Brazil -	4 45	8-6		Playa Parda Cove, Ma-	1 8		
hos, Indian	1 30	5		gellan Strait.			
, Strait, Japan	10 30	6		Pleasant Port, Falkland	5 0	6½	
land -	3 35			Islands.			
lds. (Makung	10 30	9½	7	Plettenberg Bay, Africa,	3 10	6	
hina Sea.				S. Coast.			
ay, C. Breton	7 30	6	4	Ploughrescan, France -	5 17	25½	18½
Harb., Prince	8 30	4	2½	Ploumanach, France -	5 15	24½	18½
Island.				Plumper Cove, Howe	noon.	12	
Scotland -	0 34	10½	8½	Sound, G. of Georgia,			
ge, B. of Fundy	10 41	22	18	America N. W. Coast.*			
B. of Islands,	10 42	5½		Plymouth Breakwater,	5 37	15½	11½
land.				England.			
St. Francis	12 0	6		— (Sutton Pool)	5 32	15½	11½
ralia, S. Coast.				— United States	11 19	11½	10½
ck, Patagonia,	0 50	16		— New, New	9 30	12	9
Joint, Wusung	0 35	13	8	Zealand.			
ina, E. C.				Pomba B. Africa, E. Cst.	4 0	15	11
a, U. States -	1 18	6½	5½	Pomquet, Nova Scotia -	9 15	4	2½
E. side, Ma-	9 30	24		Ponga River, Africa, W.	7 30	12	9½
rait.				Coast.			
, Capel Bay,	2 30	3-4		Poolbeg Lt. Hse., Ireland	11 12	12-14	9-11
, S. Coast.				Poole, England -	{ 9 10	6½	4½
entrance,	1 30	3-4		{ 12 45			
, S. Coast.				Poolewe, Loch Ewe,	6 39	14½	10½
Queenscliff	1 30	3		Scotland.			
Hobson Bay,	3 0	3-4		Pootoo Island, China, E.	8 15	12	
, S. Coast.				Coast.			
R. (Cherry	10 5	2	¾	Poqueldon Harb., Pata-	0 54	18	
nted States.				gonia, W. Coast.			
Bay, Chile -	9 20	5		Portaferry, Ireland -	12 0	18-21	12-16
, Nova Scotia	10 0	6	4	Port-au-Choix, Newfound-	10 47	5	
Lombok -		10-12		land.			
ur, England -	11 5	28	21	Port au Prince, Saint	8 0?	1?	
Newfoundland	8 33	6½	4½	Domingo.			
, Yellow Sea	11 45	8		Port-en-Bessin, France -	8 57	20	15½
ds., China, E.C.	8 30	17		Portchester, England -	11 46	13½	10½
				Portendik, Africa, W. C.	10 0	6	
				Porth Cawl, Wales -	6 8	28½	21½
				Porth-dyn-lleyn, Wales	8 30	16	
				Portishead, England -	7 16	41½	31
				Portland Inlet (Salmon	1 8	16	
				Cove) America, N.W.			
				Coast.			
				— United States	11 25	10	8½

\* From observations made in the month of October.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Ne.
Portland Bay, Australia, S. Coast.	h. m. Midnight.	ft. 4	ft.	Pulo Mendanao, Gaspar Strait.	h. m. 2 30	ft. 4	f
Breakwater, England.	7 1	6½	4½	Pulo Panjang, G. of Siam	7 0	2	
Porto Frio, Brazil -	2 40	4½		Pulo Timoan (W. side), China Sea, W. Coast.	6 0	7½	
Porto Praya, C. Verde Ids.	6 07	5		Puluqui Id., Patagonia, W. Coast.	1 5		
Portree, Isle of Skye -	6 32	15	10½	Puna Island, Ecuador -	6 0	11	
Portrieux, France -	6 0	31	23½	Pwlheli, Wales -	7 46	13½	
Portsbridge (Portsmouth) England.	11 48	6½*	4	Quaco, Bay of Fundy -	11 35	30	2
Portsmouth Dockyard, England.	11 41	12½	10	Quebec, R. St. Lawrence	6 38	18	1
Portsmouth, United States	11 23	10	8½	Queda, Malacca Strait -	12 0	5½	
Possession Bay, Magellan Strait.	9 0	36-42		Queen Charlotte Sd. (entrance), New Zealand.	8 50	8	
Cape, Torres Strait.	9 0	6		Queensferry, Firth of Forth, Scotland.	2 37	18	1
Id., Torres St.	1 0	9½		Queenstown, Ireland -	5 1	11½	
Post Office Island (Charles Island), Galapagos.	2 10	6		Quelan Cove, Patagonia, W. Coast.	0 28		
Id., Torres Str.	1 0	9½		Quentin, Port San, California.	9 5	9	
Pouinipet Island, Caroline Islands, N. Pacific.	6 0	4½		Quicavi Bluff, Patagonia, W. Coast.	0 57	20	
Poulamente B., Madame Id., C. Breton Id. -	7 50	6	4	Quicks Hole (S. side), U.S. (N. side) -	7 36	3½	
Poulton-le-Sands, England	11 26	27½	21½	Quilca River, Peru -	7 31	4½	
Poverty Bay, New Zealand	6 5	6		Quilimane R. (entrance), Africa, E. Coast.	8 0	6	
Pratas Shoal, China Sea	4 0	5		Quillebœuf, France -	4 15	16	
Preservation Inlet, New Zealand.	11 20	8	6	Quiloea, Africa, E. Coast	10 6	9½	
Preston, England -	11 49	10	4½	Quiloa, Africa, E. Coast	4 45	12	
Prince Frederick Harb., Australia, N.W. Cst.	12 0	28		Quoile Quay, Strangford, Ireland.	12 45	11	
Prince of Wales Strait, Banks Land.		3		Rabat, Africa, W. Coast	1 46	9-12	
Princes Id., Bight of Biafra	3 45	4½		Rachada Cape, Malacca St.	5 30	13	
Princess Royal Harbour, Australia, S. Coast	11 56	1-4		Radama Port, Madagascar, W. Coast.	4 40	13	
Prony Bay, New Caledonia.				Ragged Id., Sumbawa, Java Sea.	8 10	3	
Provincetown, U. S. -	11 22	10½	9½	Point, Borneo, E. Coast.		7	
Pubnico (Beach Point), Bay of Fundy.	9 25	12	10	Raine Id., Torres Strait	8 10	10	
Puerto Bueno, Patagonia, W. Coast.	1 40			Rajahpoo Harb., Hindoostan, W. Coast.	11 0	12	
Puerto de la Luz, Gran Canaria, Africa, W. Cst.	12 52	10		Rajang River, Borneo -	4 45	13	
Puerto de la Plata, St. Domingo -	7 30	37		Ramos R., Bight of Benin	4 20	5	
Puget Sound (Nisqually), America N.W. Coast.	6 0	18	15	Ramree Road, Bay of Bengal, E. Coast.	10 0	12	
Pugwash Har., Nova Scotia	10 30	7	4	Ramsay Sound, Wales -	6 0	17	
Pulaski Fort, United States	7 20	8	7	Ramsey, Isle of Man -	11 12	19½	1
Pulicat Shoals, Coromandel Coast.	9 25	2½		Ramsgate, England -	11 44	15	1
Pulo Aor, Sumatra, N.E. Coast.		5		Rarso Fiord, Norway -	10 45	7	
Pulo Condore, China Sea, West Coast.†	2 30	6½		Rangoon, Bay of Bengal, E. Coast.	5 30	21	1
Pulo Leat, Gaspar Strait	2 30	4		R. (entrance) B. of Bengal, E. Coast.	3 15	21	1
				Raoul or Sunday Island, S. Pacific.	6 0	5	
				Rappahannock (Saunders Wharf), United States.	3 2	2½	2
				Ras Haffun, Africa, E. C.	6 15	4	

\* Above the bed of the lake.

† From a French survey, 1862.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ommed (Gulf of h), Red Sea.	6 0	5		Ristegouche R., Campbell-	4 0	10	7
armah, Arabia,	9 0	8		town, G. St. Lawrence.			
oast.				Rivadeo, Spain, N. Coast	3 0	15	
heimah, Persian	11 45	7		Rivoli B., Australia, S.C.	10 0	4	
				Rocas, As, Atlantic	5 15	10	
sidah } Arabia {	8 30	5½		Roche Cape, R. St. Law-	9 30	6	4
ali } S. E. {	10 0	10		rence			
ed } Coast {	9 30	9		Roche fort, France	4 6	17	13
lan, Ireland	5 42	12½	9	Rochelle, France	3 31	17	13
(G. of Cambay),	2 15	18	13	Rockport, United States	10 57	10½	8
ostan, W. Coast.				Rockall, N. Atlantic	3 30	12	
Cent. America	3 6	11		Rocky Id., G. of Siam	4 0	4	
ri Inlet, Pata-	0 44	14		Rodrigue Id., Ind. Ocean	1 45	6	
W. Coast.				Romania Point (Malay	10 30		
, Ceylon, South	2 20	2½		Penin.), China Sea,			
				W. Coast.			
(Pier), Ireland	10 31	4	4	Romdals Ids., Norway	10 45	6	
Labrador	7 45	3½	1½	Rona (South) Light,	6 20	14½	10½
Durian Strait	5 0	10½		Scotland.			
ge, England	{ 10 42	{ 8½	6	Roodewall Bay, Africa,	2 30	6½	
	{ 12 57			S.W. Coast.			
ove, Bass Strait	12 5			Roque, Cape St., Brazils		10	8
le, France	6 20	35	26	Roscoff, France	4 46	23	17½
k, Iceland	5 0	17½	13½	Rosel, Jersey, English	6 15	30	21½
ous Id., Borneo,		8		Channel.			
Coast.				Roshnoff Cape, America,	7 30	15	
rg, Denmark	7 42	4		N.W. Coast.			
, R. Clyde, Scot-	1 15	9		Rota, Spain	1 24	12½	8
				Rotterdam, Netherlands	3 45	7	
on B., Marquesas	2 30	4		Rouen, France	2 28		
Port, Tanna Id.	5 35	3		Rouge Harbour, New-	7 0?	2-4?	
Id., f (St. Pierre)	noon.	3½		foundland.			
O. (St. Denis)	0 22	2½		Roundstone, Ireland	4 28	13½	10½
Id., f (St. Gilles)	1 0	2½		Revama River, Africa,	4 0	16	11½
O. (St. Paul)	1 7	4		E. Coast.			
ad, Fijii Islands.				Royal Harbour, Ruatan,	7 45	3½	
ikulu Port.				Bay of Honduras.			
io Strait	10 0	7	5	Royal Island, Bahamas	7 45	3½	
ighthouse, Eng-	10 51	24	17	Royal Port, Jamaica	11 0	1	
				Rovalist Port, Palawan,	11 0?	6½?	
to R., Gulf St.	3 30	4	2½	E. C.			
nce.				Royan, France	3 38	13½	10
d, United States	4 28	3½	2½	Ruapuke Id. (Foveaux St.)	1 0	8	6
Harb., Prince	6 0	3	2	New Zealand.			
d Island.				Rugged Id., Bahamas	8 0	3	
, Australia, E.C.	9 20			Nova Scotia	7 59	7½	6
la Plata, Cape	8 30	2		Ruggles B., Falkland Ids.	7 30	5	
os.*				Rush Port, Ireland	6 8	5½	3½
— — — Buenos	12 0	3-5		Rutland Id., Ireland, W.	5 22	11	8
— — — Barragan	7 0	5-9		Coast.			
S. America, E.C.				Ryde, England	11 20	13½	
ande do Sul,		1½-2		Rye Bay, England	11 20	22	17½
				Sabine Pass, G. of Mexico		1½	
iro, Brazil	3 0	4	3	Sable Cape (Clam Point),	8 27	8½	6½
gro, Patagonia,	11 0	14		B. of Fundy.			
st.				(Clarke's Harb.),	8 58	11	9
ez, Africa, West	10 0	15	11½	B. of Fundy.			
				Sable Island, N. side,	7 30	4	
				Nova Scotia.			
				Sable Island, S. side,	6 30	4	
				Nova Scotia.			

Rio de la Plata the rise is greatly influenced by the winds, the water being raised by S.E. depressed by those from N.W., causing at Buenos Ayres a difference sometimes of 12 feet.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Ri
		Springs.	Neaps.			
	h. m.	ft.	ft.		h. m.	ft.
Sables d'Olonne, Les, France.	3 26	14	10	Sandy Hook, United States	7 29	5½
Saboga, New Granada -	1 9	14		— Id., Madagascar, W.C.	5 0	15
Sabon Id., Durian Strt. -		10		Sanguanga (entrance)	4 10	9
Sacred Bay, Newfoundland	7 23	2½		Ecuador -		6
Sacrificios Pnt., Mexico, W. Coast.	3 15	6		Sanguir Island, Moluccas		
Saddle Id., East, China, E. Coast.	11 0	14		Sangwin R., Africa, W. Cst.	5 15	4
Sado (Yebisu), Japan Sea	5 0	2		Sanmoon Bay (St. George Island), China, E. Coast.	10 20	15
Saguenay, Chicoutimi, G. St. Lawrence.	4 11	12	8	San-shui, Si Kiang, China, E. Coast.		5-6
Saguenay, Tadousac, G. St. Lawrence.	2 45	17	10	Santa Catalina Id., California -	9 35?	5?
Saigon (C. St. James) - (Saigon City), Cochín China.	11 0	8		Santa Cruz R., Patagonia, E. Coast.	9 30	40
Saltes, Caribbean Sea -	6 45			Santa Cruz or Agadir, Africa.	12 45	9
Sal. C. Verde Ids., Africa, W. Coast.	7 45	5		Santa Island, California — Tenerife, Canary Is.	9 35?	5?
Salango Id., Ecuador -	12 41	12		—	1 30	8
Salcombe, England -	5 41	15	11½	Santa Maria Island, Chile	10 20	6
Saldanha B., Africa, W.C.	2 0	6		Santander, Spain -	3 30	15
Sale Macowa, Red Sea -	0 30	2		Santona, Spain -	3 30	12½
Salem, United States -	11 13	10½	8	Saparoa Id., Moluccas -		6
Salm R., Africa, W. Cst.	8 10	6		Sapie Bay, Sumbawa -	1 0	10
Salmedina Rocks, Spain	1 27	12½	8	Sarawak R. (Moratabas entr.)	4 0	9
Saltash, R. Tamar, England.	5 45	15	11	— Santubong (entr.)	4 0	10
Salt Cay Anchorage, Bahamas.	8 15	4	3	— Sarawak Junction City -	5 0	15-18
Saltees, St. George's Channel.	5 40			—	5 20	15-18
Salvador, San, Port, Falkland Islands.	8 10	8		Borneo, W. C.		
Samanco B., Peru -	6 30	2		Sarn Badrig or the Causeway, Wales.	7 30	13
Sambilangs, Malacca St.		12	10½	Sarn-y-bwch Reef, Wales	7 40	14
San Francisco (North Beach), California.	12 6	4½	3½	Saugor Id., B. of Bengal	8 0	6
San Bartholomew Port, California.	9 10?	7-9?		Saunarez Reef, Australia, E. Coast.		
San Blas, Mexico, W. C.	9 41	6½		Savannah (city), U. S. -	8 13	7½
San Juan (anchorage), California.	9 40?	5		— (entrance,) U.S.	7 20	8
— del Sur, Central America.	3 8?	10?		Scales Point, Blackwater River, England.	12 0	14½
— River, New Granada -	6 0	12		Scalloway, Shetland -	9 30	5½
San Lucar, Spain -	1 53	12½	8	Scarborough, England -	4 11	15½
San Miguel, California -	9 25	5	4	Scarcies Rivers, Africa, W.C.	7 10	10
San Rosa Id., California	9 30?	5?	4?	Scarnish, Tiree Id., Scot land.	5 31	11½
Sand Cay, United States	8 40	2	1	Scilly (St. Agnes Id.) -	4 30	16
Sandalwood Bay, Fiji Ids.	6 0	6?		— (St. Mary Id.), England.	4 27	16
Sand Point, G. of Liautung, Yellow Sea.	4 50	7	5¾	Sea Bear Bay, Patagonia, E. Coast.	12 45	20
Sands Pnt., United States	11 13	9	7½	Seaforth Loch, Athline, Scotland.	6 16	15
Sandy Cape, Australia, E.C.	7 50	6-8		Seaham, England -	3 24	14½
— Cove, E. B. of Fundy	10 33	21½	17¾	Seal Cove, Grand Manan, B. of Fundy.	10 54	20
Sandy Cove, W., Bay of Fundy.	10 47	23	19	Seal Id., C. Sable, Bay of Fundy.	9 49	12¾
				Seamount Bay, Mulroy B., Ireland.	6 44	7½
				Sebastian, San, Brazil -	2 0	4
				— Tierra del Fuego	7 0	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
, Spain, N. Coast	3 0	12	9	Shucartie Bay, Vancouver Id.		12	
gur Bay,* Hin-				Si Kiang or West River,			
m, W. Coast.				China, E. Coast :			
, China Sea, W.C.	9 44	7		„ (San-shui) -			5-6
de, France -	3 21	17½	12	„ (Shao-king) -			3
Bay, Lapland -	7 9	9		„ (Wuchan) -			1-1½
Bill, England -	11 45	16½	12½	Siak River, Malacca Str.	9 0	12	
noo Bay, Gulf of	2 0	12		— off the town -		11	
ria, America,				Sidmouth Cape, Australia,	9 15	10	
Coast.				E. Coast.			
, Africa, W. Coast	10 30			Sierra Leone, Africa, W.C.	7 55	8	
Bk. Mosquito Cst?		2		Sillebar R. (Bar), Sumatra	6 0	4½	
la Bank, Mosquito	irr.	2		Simidsu, Japan Sea -	7 30	7	
				Simoda Port, Japan Sea	5 0	3-5	
Islands, Hang-chu	11 45	14		Simonoseki, Japan Sea -	8 30	8	6
China, E. Coast.				Simons Bay, Africa -	2 44	5½	3½
Portugal -	2 30	8		Simons St., Island, U.S.	7 43	8½	6½
River, (entrance,)	3 31	15	11½	Singapore, New Harbour,	9 45	10	7½
re.				Malacca Strait.			
le Archip. (Mayhé	4 0	6½		Sinou, Africa, W. Coast -	5 0	4	
idian Ocean).				Sir C. Hardy Ids., Torres	9 15	10	
Id., Ladrone Ids.	6 45	2½		Strait, E. Coast.			
slands, Lapland -	8 20	12		Sir E. Pellew Islands,	7 30	4-7	
— Bay, Gulf	1 40	9	5	Australia, N. Coast.			
awrence.				Sisal, Gulf of Mexico -		2	
Kadún, Arabia,	9 20	10		Sitka, America, N.W.C.†	0 34	5-7	
Coast.				Skaapen Fiord, Færø			
-saifeh, Arabia,	9 45	10		Islands :			
Coast.				Between Stormoe and	5 0	9½	7½
Harb., Falkland	9 30	6		Sandoe.			
				Between Hestoe and	5 30	9½	7½
ai, Yang-tse-Kiang,	0 40	10	7	Sandoe.			
a, E. Coast.				Skagen or the Skaw,	5 56	1	
ng, Si Kiang,		3		Jutland.			
a, E. Coast.				Skerry, Great, E. side,	11 4	9½	6
Persian Gulf -	1 0	6		Pentland Firth.			
B., Australia, E.C.	12 0	2-5		Skerry, Great, W. side,	10 53		
Harbour, New	1 0		2	Pentland Firth.			
swick.	8 0	4		Skerries, Ireland, N. Cst.	6 15	5	3
aven, Ireland -	5 32	11¾	8½	— E. Coast. -	11 0	13½	10
ss, England -	0 37	16	13½	Skip Ness, Scotland -	11 50	9	
arb., Nova Scotia	8 6	6½	4½	Skull, Ireland -	4 2	9¾	7½
Island, Africa, S.C.	4 40	12		Slaughden, Orford, Eng-	1 0	7½	
d Island, U. States	10 58	8½	7½	land.			
ne, Nova Scotia -	8 4	7	5½	Slievebane Bay Ireland,	5 49	10½	7¾
ke Island, Gulf	6 0	5	3	W. Coast.			
awrence.				Sligo (Bay), Ireland -	5 18	11½	
, R., Africa, W.Cst.	6 0	11		— Harbour, Ireland	5 23	11½	8½
, North, England	3 23	13¼	10	Slyne Hd., Ireland, W.C.	4 30	13¼	10
Bay, Yellow Sea	1 30			Smalls Lighthouse, St.	6 0	21	
arb., Nova Scotia	7 54	6½	4½	Georges Channel.			
— (New Id.),	10 30			Smerwick, Ireland -	3 50	11½	8
land Islands.				Smithville, United States	7 19	5½	4¾
gan, Gulf St.	3 42	5½	3	Smoky Bay, Australia,	12 15	6	
rence.				S. Coast.			
ay, Australia, N.C.	6 0	18-25	14-20	Smyth Harbour, Tierra	12 0	6½	
— E. Coast -	8 30			del Fuego.			
Vater B., Australia,	10 30	12-18		Snape Bridge, Orford,	3 0	6	
oast.				England.			
am, England -	11 34	18	13¼				

g tides rise a.m. 6 feet, p.m. 7½ feet from October to March ; and the contrary during the rest of

rise at Sitka as given by Commander Pearce, H.M.S. Alert, in his remarks in 1860, does not feet, but on the authority of Commander Pike, H.M.S. Devastation, (1862,) the local pilots say rise sometimes is as much as 16 feet.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	R
		Springs.	Neaps.			
	h. m.	ft.	ft.		h. m.	ft.
Socoa, France - -	3 19	12½	8½	Streaky Bay (Blanche- port), Australia S. C.	1 0	5
Socotra Id., Indian Ocean	7 20	8		Stroma, S. side, Pentland Firth.	9 47	9
Sofala R., Africa, E. Coast	4 0	19		Stromness, Orkneys -	9 0	10
Solovet Road, White Sea	5 0	4		Suadiva Atoll, Maldives	1 0	4
Solway (Tarn Point), Scotland.	11 22	23	18	Sual Port, Luzon - -		6
Sosnovaia Bay, White Sea	2 40	6		Suderoe Fiord, Færoe Ids.	6 0	9½
Sosnovets, White Sea -	11 44	18		Suez Bay (head of Gulf), Red Sea.	2 0	6
Souma, White Sea -	6 30	5½		Sughrâ, Arabia, S.E. Cst.	8 0	6
South Farallon, California	10 37	4½	3½	Sumburgh Head, Shetland	9 45	
South Rock, Ireland	10 58	13	10½	Sunday or Raoul Island, S. Pacific.	6 0	5
Southampton, England -	{ 10 30 12 45 }	{ 13 9½ }		Sunderland, England -	3 22	14½
South West Bay, New Providence.	7 30	4		— N., England -	2 30	15
— Cape, N. Zealand	12 0	7	5	Supé Bay, Peru - -	4 50	3
Southernness, England -	11 20	28		Surat, Hindoostan, W. C.	4 0	19
Southwold, England -	10 20	6½	4½	Surin, St., France - -	4 11	14½
Spain, Port, Trinidad -	4 30	4	3	Surinam, Guayana -	6 0	5½
Spensers Anchorage, Bay of Fundy.	11 42	39	33	Sussex Port, Falkland Ids.	8 15	6
— Bay, Africa, S.W. Coast.	10 50	5-6		Sutton Pool, England -	5 32	15½
Spenser Gulf, (Thorny Passage,) Australia, S. Coast.	12 0	6-8		Sviatoi Nos, Lapland -	9 15	14
— Point Lowly -	7 0	6-8		Svineoe Fiord, Færoe Ids.	12 0	6½
— Port Augusta* -	8 30	9-12		Swain Reefs, Australia E. Coast.	10 25	10
— Point Riley -	5 45	4½		Swan Id., Bass Strait -	9 35	6
— Wallaroo - -	irr.	4-5		— River, Port Grey, Australia, W. Coast.	9 0	1-1½
Spicers Cove, B. of Fundy	11 35	37	30½	Swansea, (Mumbles Lighthouse), Wales.	6 1	27½
Spider Id., China, E. C. -	10 0	17		Swift Bay, Australia, N. Coast.	12 0	21
Spitzbergen (Bell Sound)	8 56	3½		Swona, E. side, Pentland Firth.	10 24	10
Spurn Pt. (Humber R.), England.	5 26	18½	15	— W. side, Pentland Firth.	9 35	10
Staten Island, Tierra del Fuego.	4 30	8		Sydney, Australia, E. Cst.	8 38	4½
Staunton Id., Yellow Sea	1 30			— Harb., Cape Breton	9 0	5
Stellacoom Fort, Oregon	4 46	11	9½	Table Bay, Africa, W. Cst.	2 40	5
Stephen Port, Australia, E. Coast.	9 0	6		Tabou R., Africa, W. Cst.	4 45	3-4
— Falkland Islands.	7 45	7½		Tabuai Island, S. Pacific		3
Stewart Harbour, Tierra del Fuego.	2 50	4		Tadeo, San, River, Pata- gonia, W. Coast.	11 45	6
Stirling, Firth of Forth, Scotland.	3 52	7½	4½	Tahiti, S. Pacific -	noon.	1½
Stirrup Cays, Bahamas -	7 0	4		Tahrî, Persian Gulf -	5 0?	
Stockton (Tees), England	4 40	11		Taichow Ids., China, E. C.	9 0	14
Stonefield (Loch Etive), Scotland.	7 3			Tai-Tai Bay, China Sea, E. Coast.	9 30	5½
Stonehaven, Scotland -	1 10	14	11	Talcahuano, Chile -	10 14	5
Stonington, United States	9 7	3½	3	Talcan Island, Patagonia, W. Coast.	1 3	15½
Stornoway, Lewis Island, Scotland.	6 46	13	9½	Tailung Channel, Canton River, China.	1 30	6½
Strangford (Killard Point), Ireland.	10 53	14	11½	Ta-lien-whan Bay, Yel- low Sea.	10 10	12
— Quay - -	12 31	10½	8½	Tam-Sui Harbour, China Sea, E. Coast.	11 45	7-12
— Head of Lough (Turley Rocks).	12 44	11½	9½	Tamar R., George Town, Tasmania.	11 15	12½

\* At Port Augusta, when the winds veers round to West and South, and blows strong, the rise has been as much as 16 feet. Commander John Hutchison, R.N., Admiralty Survey, South Australia, 1862.

ce.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Launceston,	h. m. 1 0	ft. 12½	ft.	Thompson Sd., New Zealand.	h. m. 11 30	ft. 8	ft. 6
rt, Magellan	3 5	5		Thorny Passage, Spencer Gulf, Australia, S. C.	12 0	6-8	
Madagascar,	4 18	8		Thorsminde, Jutland -	3 34	2	
United States	11 21	1½	1½	Three Hummock Island (E. side), Bass Strait.	10 30	10	
Channel,	6 0	6	5½	Three Kings Islands, New Zealand.	8 0	7	
umer Islands,	6 37	14	10½	Three Points Cape, Africa, W. Coast.	4 0	4	
rica, N. Coast	1 42	8		Three Rivers, River St. Lawrence.	11 30	1	
arbour, Mada-	4 30	6		Throgs Point, U. S. -	11 20	9½	7½
Coast.				Thurso, Scotland -	8 28	14½	11
i, China Sea		7		Ticao Island, (Port San Jacinto) Filipinas.	6 30	6	
lus, Malacca	9 30	10½	8½	Tietoc Bay, Patagonia -	1 45	11	
Hebrides -	5 35	3		Tien-pak Harb., China, East Coast.	12 0	8½	
ck, U. States	0 42	2	1½	Timballier Bay, G. of Mexico.	irr.	2	
Harbour, Su-	6 10	6		Tinghae, Chusan, China, E. Coast.	11 0	12	9
r New Ply-	9 30	12	9	Tobago, Caribbean Sea -	irr.	3½	
ew Zealand.	4 57	14½	10½	Tobermory, Isle of Mull	5 36	13	9½
land - -	1 46	6	3½	Toboe Ali Point, Banka Strait.	8 30PM* } 10 0AM† }	12	
n - -	11 22	23	18	Tomo (Seto-uchi), Japan Sea.	11 0?		5
Norway, Scot-				Tongatabu, S. Pacific -	6 50	4	
ove, United	8 4	2½	2½	Tongsang Harb., China, E. Coast.	11 30	12	
United States	9 57	4	3½	Tonning, Germany -	2 1	9	
he, Nova	10 0	8	5	Tooniang Id., Bias Bay, China, E. Coast.	8 0		
ay, Japan Sea	5 50	5		Torban, England -	6 0	13½	10
arbour, New	7 10	6	4½	Toro Point, Chile -	9 45		
ntrance) Bay	10 30	20		Tortola, Virgin Islands -	8 30	1½	
, E. Coast.				Tortugas, Florida, U. S.	9 56	1½	1
(Bar), Scot-	2 6	16	14	Towan Id., China, E. C.	9 20	13	
-bay, China	10 15	6		Tower Id., Galapagos -	?	?	
oast.				Townshend Harb., Tierra del Fuego.	2 30	5	
oad, Baly. (N.	5 0	6½		Townshend Port, Oregon	3 49	5½	5
., Ireland -	5 16	11½	8½	Tracadie, Prince Edward Island.	7 0	3½	2
ir), England	3 45	15		Træ Islands, Norway -	11 45	7	
, England -	6 0	13	9½	Trawbreaga Lough, Ireland.	6 10	11½	8½
es - -	6 0	27	20	Tréguier, France -	5 32	25	18½
pe Verd Ids.,		8½	6	Trek Island, White Sea -	10 48	20	
uz).				Trepassey, Newfoundland	7 0	6½	5
zores -	12 32	4½		Treport, France -	11 9	27	21
., Lapland -	7 20	12		Tres Cruces Point, Patagonia, W. Coast.	1 15	16	
(West),	8 40	6	5	Triangles, Gulf of Mexico		1½	
ds.	3 17	7		Trincomalie Har., Ceylon, S. Coast.	8 18	2	1½
ite Sea -	2 23	2½	1½	Tringano R., G. of Siam, China Sea, W. Coast.	8 0	7	
ica, N. Coast	6 30	4	3½				
ide Shoals),							
ds.							
ad, Australia,	10 45	12-18					
Id., Africa -	3 25	4½					

\* In S.E. monsoon.

† In N.W. monsoon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Trinidad (Port Spain), Caribbee Islands.	4 30	4	3	Urakami, Japan Sea -	7 30	6	
Trinity Bay (Bull Id.)	7 22	3½	2	Uranouchi, Japan Sea -			
Newfoundland.				Urie Firth, Shetlands -	9 45	6½	
Opening, Great	9 15	7-12		Ursula Id., Palawan, China	11 0	7½	
Barrier Reefs.				Sea, E. Coast.			
Tristan d'Acunha, South		8		Ushant, France - -	3 32	19½	13
Atlantic.				Ushruffi Islands, Red Sea	6 14	2	
Triton Harb., New-	7 0?	2-4?		Utria, New Granada -	4 0	12	
foundland.				Værø, Norway - -	12 0	9	7
Tromsø, Norway - -	1 45	8		Valdivia Port, Chile -	10 35	5	
Troon, Scotland - -	11 50	10	7½	Valentia Harb., Ireland -	3 42	11	8
Troubridge Shoals, Aus-	3 30	6		Valentine Harb., Magellan	2 0		
tralia S. Coast.				Strait.			
Truro, England (Town	5 5	10	6	Valery St. en-Caux, France	10 46	27	21
Quay).				sur-Somme,	11 46	27	21
Tsang chow Id., Bias	8 30			France.			
Bay, China, E. Coast.				Vallay, North Uist, Scot-	6 10	11½	8
Tsau-liang-hai or Chosan	7 45	7	5	land, W. Coast.			
Harb., Japan Sea.				Vallenar R., Patagonia,	0 18	5	
Tsu-sima Sound, Japan	8 30	8		W. Coast.			
Sea.				Valparaiso, Chile -	9 32	5	
Tsugar Strait, Japan Sea	5 0	5		Vansittarts Saddle, Yel-	4 20	10	8
Tudwall, St., Road, Wales	7 45	14		low Sea.			
Tumaco Road, Ecuador -	2 33	12		Vao Port, Isle of Pines,	8 6	4	
Tunis, Mediterranean -		3		New Caledonia.			
Turna Bay, White Sea -	9 54	11		Veere, Netherlands -	1 20	15	
Turner C., Prince Edwd.	6 10	4	2	Ventry Ireland -	3 44	10½	7
Island.				Venus Harbour, Australia,	2 15	6	
Turon B., Cochin China	3 0	4		lia, S. Coast.			
Tuticorin Harb., G. of	1 15	2½	1½	Vera Cruz, G. of Mexico		2	
Manar, Bay of Bengal,				Verde C., Africa, W. C.	7 45	5	
W Coast.				Vernilion Bay, G. of	irr.	2½	1
Tutukaka Harbour, New	7 0	9	7	Mexico.			
Zealand.				Vernon Chan. (Chusan	9 40	14	
Tweed River (Danger	9 45	5-8		Arch), China, E. Coast			
Point), Australia E.C.				Versavah, Hindoostan,	12 15	16	
Twofold B., Australia, E.C.	10 0	7	5	W. Coast.			
Tylatiap Harb. Java, S.C.	8 45	3½		Verte Bay, Nova Scotia	10 0	9	5
Tynemouth (Bar), England	3 20	14½	11	Victoria Port, Brazil	3 0	4	
Typha Anchorage, China,	10 0	7		St. Juan de Fuca	irr.	7-10	
E. Coast.				Strait.			
Uist North (Kallin), Scot-	5 59	13½	9½	Victoria R., Mosquito Flat,	12 19	15-24	
land, W. Coast.				Australia, N.W. Coast.			
— (Vallay), Scot-	6 10	11½	8½	Sandy Island,	1 17	3-10	
land, W. Coast.				Australia, N.W. Coast.			
— South, (Loch Bois-	5 47	12½	9½	Turtle Pt.,	7 15	7-13	
dale), Scotland W. C.				Australia, N.W. Coast.			
Ullapool, Loch Broom,	6 40	14½	10½	Vigo, Spain - -	3 0	12-13	
Scotland.				Vin Harbour, G. St. Law-	5 45	5	3
Ummen Nakheilah, Per-	7 30?	8?		rence.			
sian Gulf.				Vincent, St., Cape, Mada-	4 45	12	
Underwood Port, New	6 10	8	6	gascar, W. Coast.			
Zealand.				Port St., New	5 50	4½	
Union Bay, La Plata -	3 10	12	9	Caledonia.			
Union, Port la, G. of	3 15	10½	8½	Virgin C., Magellan	8 30	36-42	
Fonseca, Cent. America.				Strait.			
Upemvik, Greenland -	11 0	8		Vivero, Spain, N. Coast -	3 0	15	
Upstart Bay, Australia,	9 0	6		Vladimir, St., Bay, G. of	irr.	2	
E. Coast.				Tartary.			
				Volcano Ida., China, E.	11 30	15	7½
				Coast.			



	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
White Sea - 1, Færoe	11 20 6 0	17 9½	7½	West Cove, Kenmare R., Ireland.	3 52	10	7½
(Ceram), oluccas.	6 0	3		— Gat, Netherlands -	1 45	7	
New Zea-	9 30	12	9	— Hill, Australia, E. C.	10 20	24	
, Choiseul Ids.	6 20	5½		West Quoddy, B. of Fundy	11 12	21	17
yne, Eng-		10½		West River, China, E. Coast, see Si Kiang.			
Nova Scotia rres Strait y, Africa,	10 30 irreg. 1 54	8 7 6	5	Western Port, Australia, S. Coast.	1 10	8	6
entrance), oast. ity), China,	9 0 9 30	15½ 15½		Westmanshaven, Færoe Ids.	8 0	9½	7½
New Zea-	10 15	8	6	Westness, Orkneys -	9 11	10	7½
, New Zea-	11 20	7	6	Weston-super-mare, Eng- land.	6 54	37	28½
bour, New	7 0	9	7	Westport, Ireland -	4 57	12¾	9½
rbour, New	8 15	7		Wexford, Ireland -	7 21	5	3½
rbour, New	7 10	9	7	Whampoa { In March -	1 40	} 7-8	
urb., G. of e. ay, River and. , Australia,	10 30 5 47	5 14½	3 10½	(Docks), { In April -	1 15		
Carling- l. ough Foyle,		3-4		China { In May & June	0 30		
nited States idge), Ire-	9 0 6 6	3 13½	2¾ 10¾	See foot note, p. 169.			
Duncannon	5 20	12½	10	Whitby, England -	3 45	15	11½
frica, S. Cst. Tierra del	4 0 2 0	6 5		White Dog Ids., China, E. C.	9 0	18	
Harbour,	9 30	9		Whitehaven, England -	11 14	23½	18¼
R. Tamar,	6 17	5½	1½	— Nova Scotia	8 0	6½	4½
Patagonia,	0 50	7½		Wick, Scotland -	11 22	10	7½
Australia,	7 30	8-12		Wicklow, Ireland -	10 29	9	6½
ted States d -	11 5 7 0	13½ 12	12	Wide Bay, Australia, E. C.	9 0	6-8	
igland -	6 20	18		Widewall, Orkneys -	9 3	10	7½
, Galapagos ight vessel),	2 10 11 30			Wigton, Scotland -	11 30		
				William Prt., Falkland Ids.	5 15	7	5½
				— New Zealand	12 45	8	6
				— Scotland, W. C.	11 10	18	10
				Willis Islets, Australia, E. Coast.	8 0	6	
				Willoughby Cape, Kan- garoo Id., Australia.	4 10	6	
				Wilmington, United States	9 6	3	2¾
				Wilson Promontory, Aus- tralia, S. Coast.	2 0	10	
				Winter Harb., Melville Id.	1 30	3¾	
				Winterton Ridge, England	7 50		
				Wisbeach, England -	7 30	15	
				Wisbeach Eye, England		20	
				Wivenhoe, Colne River, England.	12 10	15	10
				Wolstenholm Sound, Arctic Regions.	11 8	7½	
				Woodbridge Haven (Bar), England.	11 45	12	9
				— (Kingston Quay), England.	0 35	10	
				Woodbridge, (Wilford Bridge), England.	0 55	7	
				Woodlark Id., Louisiade Archip.	7 15	4	
				Woods Hole (entrance from Vineyard Sound), United States.	8 34	2	1½
				— (entrance from Buzzard Bay), United States.	7 59	4½	4

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Woolwich, England -	1 37	18½	15½	Yellaboi, Africa, West Coast.	7 10	10	
Workington, England -	11 4	20	15	Yeu, Ile d', France -	3 6	14½	10
Wrabness, Stour River, England.	12 29	12		Ylo Road, Peru -	8 15	6	
Wranger Oog, Germany	12 0	9?		Yndependencia B., Peru	4 50	4	
Wrath Cape, Scotland -	7 30	15½		Yoku-hama, Yedo Bay, Japan Sea.	6 0	6½	
Wreck Reef, (Bird Islet) Australia, E. Coast.	8 3	6		York C., Australia, East Coast.	11 15	10	
Wuchu, Si Kiang, China, East Coast.		1-1½		— Factory, Hudson Bay	11 15	10-14	
Wusung River (entrance), Yang-tse-Kiang, China, E. Coast.	0 30	15	10½	— River (Moody's Wharf), United States.	9 35	3½	
— (Pheasant Point)	0 35	13	8	— Road, Magellan St.	2 0	9	
Wynkoops Bay, Java -	5 0	4½	4	Youghal, Ireland -	5 14	12½	10
Yang-tse Kiang (entrance), China, E. Coast.	12 0	15	10	Yung R., Chinhae, China, E. Coast.	11 20	12½	
Yarmouth Haven (Brush) England.		5¾	4¼	— Ning-po-fu, China, E. Coast.	1 0	9	
— Bay of Fundy	10 9	16	13	Yung-hing Bay, Japan S.	5 20	2½	
— Bridge, England		5	4	Yura Harbour, Japan Sea	6 5	6½	
— Road, England	9 15	6	4	Zambezi River (Pearl Id.), Africa, E. Coast.	4 30	12-13	
— Isle of Wight, England.	{ 10 0 12 0 }	{ 7 6½ }	{ 6½ 11½ }	Zanzibar, Africa, E.C. - (Channel)	5 20	10	
Yealm River, Bigbury Bay, England.	5 37	16½	11½	— Africa, E. Coast.	4 15	11	
Yedo Bay, (Yoku-hama) Japan.	6 0	6½	4¾	Zebu Port, Filipinas -	12 0	7	
				Zeyla, Africa, E. Coast	7 15	8½	
				Zieriksee, Netherlands -	2 0	11	

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# TIDE TABLES

FOR THE

BRITISH AND IRISH PORTS,

FOR THE YEAR

1865 ;

ALSO THE TIMES AND HEIGHTS OF HIGH WATER AT FULL AND CHANGE  
FOR THE PRINCIPAL PLACES ON THE GLOBE.

COMPUTED BY JOHN BURDWOOD, STAFF COMMANDER, R.N.

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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1864.



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TH - - - - "	5	13	21	29	37	45	53	61	69	77	85	93
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TSMOUTH - - "	2	10	18	26	34	42	50	58	66	74	82	90
LENSTOWN - "	9	17	25	33	41	49	57	65	73	81	89	97
ERNESS - - - "	3	11	19	27	35	43	51	59	67	75	83	91
ELDS (NORTH) "	5	13	21	29	37	45	53	61	69	77	85	93
30 BAY - - - "	8	16	24	32	40	48	56	64	72	80	88	96
DERLAND - - "	4	12	20	28	36	44	52	60	68	76	84	92
JESO - - - - "	5	13	21	29	37	45	53	61	69	77	85	93
TERFORD - - "	9	17	25	33	41	49	57	65	73	81	89	97
STON-SUPER-MARE	7	15	23	31	39	47	55	63	71	79	87	95

## NOTICE.

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If it be desired to reduce the Mean Time at any Place to that of Greenwich (or Railway) Time, (which latter is used in the Tide Tables, published in Liverpool and Glasgow,) the following correction must be applied to the Time given in these Tables :—

	Minutes.
Brest - - -	+ 18
Devonport - -	+ 17
Portsmouth - -	+ 4
Dover - - -	- 5
Sheerness - -	- 3
Harwich - - -	- 5
Hull - - -	+ 1
Sunderland - -	+ 5
North Shields -	+ 6
Leith - - -	+ 13
Thurso - - -	+ 14
Greenock - - -	+ 19
Liverpool - -	+ 12
Pembroke - - -	+ 20
Weston-super-mare -	+ 12
Holyhead - - -	+ 18

For the Irish Ports, should Dublin Mean Time be required, the following correction must be applied to the time given in these Tables :—

	Minutes.
Kingstown - - -	- 1
Belfast - - -	- 2
Londonderry - -	+ 4
Sligo - - -	+ 9
Galway - - -	+ 11
Queenstown (Cork) -	+ 8
Waterford - - -	+ 3

The above corrections are also given at the foot of each page under the place for which the times and heights of high water are predicted.

## ADVERTISEMENT.

---

the following Tables the time of High Water is given to *Mean* time at Place. Those who are desirous of knowing the *Apparent* time, (or that shown by the Sun,) which High Water occurs, must apply the equation of time, by addition or subtraction, as directed for that purpose.

The height of the tide in these Tables is calculated from the mean level of the lower of ordinary springs, because the soundings expressed in most charts are reduced to that level. The height therefore which is given at each place is the actual rise of the water above the mean low-water level of spring-tides.

In the column of the Moon's transit, (m) stands for morning, and (a) for afternoon.

The Moon's age is given in days, and tenths of a day, from the time of her conjunction, or change; thus, it is New Moon on the 25th of April, at 2 h. 13 m. in the forenoon, and therefore, on the 26th of April, at noon, the moon being 2 h. 47 m. past New, her age may be accounted as nine tenths of a day, and is expressed by 0.9.

The highest equinoctial tides take place, on the west coast of Ireland and on the north coast of England, three transits after the New and Full Moon, unless diverted by gales of wind or other extraordinary causes. Along the east coast of England, they take place four transits after the New and Full Moon. In the river Thames they take five transits after the same epoch. These differences arise from the cause, that the same tide-wave which produces high water on the west coast of Ireland takes half a day in its progress from thence to the east coast of England, and a whole day before it arrives in the river Thames.

The time of high water at Brest is added for the benefit of vessels navigating the north coast of France and the adjacent sea.

Immediately after the Tide Tables, at page 98, will be found a convenient method of computing, from them, the height of the tide at any intermediate hour, between high and low water.

The next Table, at page 101, shows the depths on the dock-sills at Falmouth, Devonport, Plymouth, Portsmouth, Sheerness, Chatham, Woolwich, Deptford, London, Hull, Middlesbrough, Hartlepool, Sunderland, Leith, Pembroke, Liverpool, Birkenhead, Dublin, and Londonderry.

In page 103 will be found a collection of Constant Differences, by which the time of high water at certain other ports may be approximately found.

In page 108 a description is given of the general set of the tides in the neighbourhood of several parts of the coast, including a full account of the streams among the Orkneys, and through the Pentland Firth, by Captain F. W. L. Thomas, R. N. and the development, by Rear-Admiral F. W. Beechey, of the movement of the great tide-wave up the English and Irish Channels, and into the North Sea; to which has been added a description of the set of the tides in the vicinity of Rathlin and on the north coast of Ireland by Richard Hoskyn, Staff Commander, R. N.

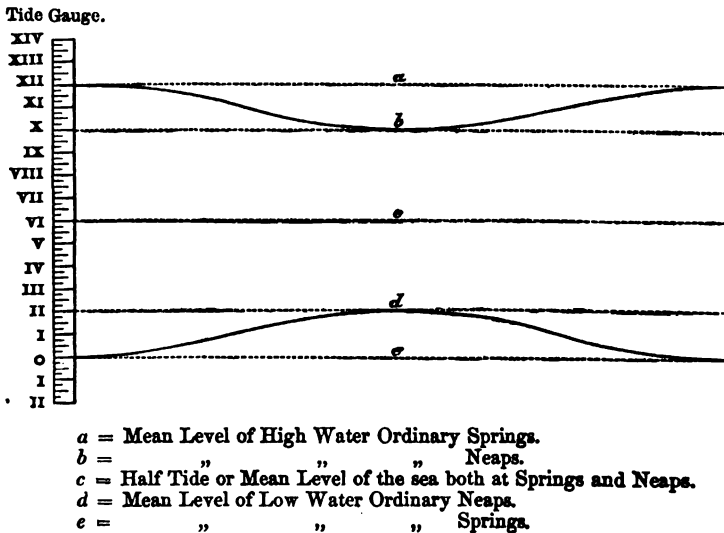
Lastly, there is appended the time of high water on the days of Full and Change at various places on the globe arranged according to the apparent progress of the tide-wave, and also alphabetically; with the rise of the tide at springs and neaps.



The stations at the several ports where the tidal observations were made on which the predictions in these tables are based, are as follows,—viz :—

Brest, entrance of the basin—Devonport, Dockyard—Portsmouth, Dockyard—Dover, North Pier—Sheerness, Dockyard—London Docks (reduced to London Bridge, the latter being given in these tables, by applying to the times at the docks  $+10^m$  and to the heights  $-4^{ins}$ )—Harwich, Angel Quay—Hull, Victoria Dock—Sunderland, North Dock—North Shields, Low Lighthouse—Leith, East Pier—Thurso, near Scrabster Pier—Greenock, East Dock—Liverpool, St. Georges Pier—Pembroke, Dockyard—Weston-super-mare, Bairnbach Island—Holyhead, Pier—Kingstown, Watering Pier—Belfast, New Dock—Londonderry, Ship Bridge—Sligo Bay, Mullaghmore—Galway, Nimmos Pier—Queenstown, Scott's Wharf—Waterford, Duncannon Fort.

The following diagram is intended to explain the terms Spring Rise, Neap Rise, and Neap Range as made use of on the Admiralty Charts and in the Sailing Directions published by the Admiralty :—



*Example.*

	ft.
Spring Rise (or Mean Spring Range) = $e$ to $a$	= 12
Neap Rise " " = $e$ to $b$	= 10
Neap Range " " = $d$ to $b$	= 8

**TIDE TABLES**  
**FOR THE**  
**BRITISH AND IRISH PORTS**  
**FOR THE YEAR**  
**1865.**

## TIDE TABLES FOR THE

JANUARY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																													
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																										
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																									
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																								
S.	1	3a22	5 57	19 5	6 19	19 2	7 51	16 0	8 13	15 2	1 36	12 10	1 59																															
M.	2	4 14	6 43	18 9	7 8	18 3	8 36	15 7	8 57	14 9	2 21	12 9	2 45																															
Tu.	3	5 6	7 32	17 8	7 57	17 1	9 19	15 0	9 43	14 3	3 9	12 4	3 32																															
W.	4	5 58	8 23	16 5	8 51	15 10	10 8	14 2	10 34	13 7	3 55	11 10	4 20																															
Th.	5	6 50	9 20	15 4	9 53	15 1	11 1	13 7	11 31	13 1	4 47	11 3	5 15																															
F.	6	7 42	10 31	14 11	11 13	14 10	—	—	0 7	13 1	5 46	10 9	6 22																															
S.	7	8 36	11 54	15 0	—	—	0 45	12 11	1 23	13 0	7 2	10 6	7 41																															
S.	8	9 30	0 30	15 2	1 3	15 6	2 1	13 2	2 37	13 3	8 18	10 10	8 54																															
M.	9	10 24	1 36	15 11	2 3	16 5	3 11	13 9	3 43	13 10	9 28	11 4	9 57																															
Tu.	10	11 17	2 28	17 0	2 51	17 5	4 11	14 4	4 37	14 3	10 24	11 9	10 47																															
W.	11	morn.	3 13	17 10	3 34	18 1	5 2	14 11	5 26	14 7	11 9	12 1	11 30																															
Th.	12	0 7	3 54	18 3	4 14	18 4	5 47	15 3	6 7	14 9	11 50	12 3	—																															
F.	13	0 56	4 33	18 5	4 50	18 5	6 26	15 5	6 46	14 10	0 10	12 3	0 29																															
S.	14	1 42	5 7	18 4	5 24	18 3	7 3	15 5	7 19	14 8	0 48	12 3	1 7																															
S.	15	2 26	5 40	18 1	5 56	17 10	7 34	15 1	7 48	14 3	1 24	12 2	1 41																															
M.	16	3 9	6 13	17 7	6 29	17 3	8 4	14 7	8 21	13 9	1 58	12 1	2 14																															
Tu.	17	3 51	6 46	16 10	7 3	16 5	8 36	13 11	8 49	13 4	2 30	11 9	2 47																															
W.	18	4 33	7 22	15 11	7 42	15 5	9 4	13 4	9 21	12 10	3 4	11 5	3 22																															
Th.	19	5 15	8 2	14 10	8 23	14 4	9 39	12 9	9 58	12 4	3 41	11 0	4 0																															
F.	20	6 0	8 46	13 10	9 14	13 6	10 20	12 2	10 45	11 11	4 20	10 6	4 42																															
S.	21	6 46	9 48	13 4	10 25	13 3	11 13	11 9	11 47	11 9	5 9	10 0	5 42																															
S.	22	7 35	11 3	13 3	11 44	13 6	—	—	0 25	11 10	6 17	9 9	6 52																															
M.	23	8 28	—	—	0 23	13 11	1 4	12 1	1 43	12 2	7 32	9 11	8 11																															
Tu.	24	9 22	0 59	14 7	1 30	15 4	2 21	12 9	2 58	12 11	8 49	10 7	9 21																															
W.	25	10 19	1 58	16 2	2 21	17 0	3 33	13 9	4 2	13 9	9 50	11 5	10 16																															
Th.	26	11 17	2 44	17 9	3 7	18 8	4 31	14 9	4 56	14 8	10 40	12 1	11 3																															
F.	27	0a14	3 30	19 4	3 52	19 10	5 22	15 7	5 46	15 3	11 26	12 9	11 48																															
S.	28	1 10	4 15	20 3	4 37	20 6	6 10	16 2	6 34	16 0	—	—	0 11																															
S.	29	2 5	4 58	20 9	5 20	20 9	6 58	16 7	7 18	16 0	0 34	13 4	0 57																															
M.	30	2 59	5 42	20 7	6 42	20 4	7 39	16 6	8 2	15 10	1 20	13 5	1 43																															
Tu.	31	3 53	6 26	20 0	6 48	19 5	8 23	16 2	8 46	15 6	2 6	13 4	2 27																															
Half Mean Spring } Range.			9ft. 6in.						7ft. 9in.						6ft. 4 in.																													
Phases of the Moon.																						Moon's Declination at Noon.																						
			D. H. M.						M.D.			°			/			M.D.			°			/			M.D.			°			/			M.D.			°			/		
First Quarter			4 3 42			Afternoon.			1			78.			18			9			19 N.			38			17			28.24			25			1								
Full			11 11 0			Afternoon.			2			2			38			10			19 13			18			6			15			26			1								
Last Quarter			20 2 36			Morning.			3			2 N.			10			11			17 49			19			9			53			27			1								
New			27 9 30			Morning.			4			6			47			12			15 35			20			13			10			28			1								
									5			10			59			13			12 39			21			15			57			29			1								
In Apogee			17 6 0			Morning.			6			14			32			14			9 14			22			18			3			30			1								
In Perigee			29 3 0			Morning.			7			17			15			15			5 29			23			19			17			31			1								
									8			18			58			16			1 34			24			19			29			1											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4

JANUARY, 1865.

DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	D.
3 19 2	1 36 19	1	2 44 16	4	3 5 16	4	4 15 19	7	4 37 19	6	3 0	
0 19 0	2 25 18	9	3 27 16	2	3 49 16	0	4 58 19	5	5 20 19	3	4 6	
0 18 4	3 13 17	11	4 14 15	10	4 38 15	6	5 43 19	1	6 8 18	9	5 6	
6 17 6	4 1 17	0	5 2 15	2	5 27 14	10	6 30 18	5	6 58 18	1	6	
7 16 6	4 53 15	11	5 55 14	7	6 26 14	3	7 25 17	9	7 55 17	4	7 6	
1 15 7	5 52 15	4	6 59 13	11	7 34 13	9	8 26 17	0	9 3 16	9	8 6	
9 15 3	7 7 15	5	8 13 13	9	8 54 13	10	9 40 16	7	10 17 16	6	9 6	
4 15 8	8 19 16	0	9 32 14	0	10 7 14	2	10 56 16	7	11 33 16	8	10 6	
1 16 4	9 20 16	8	10 39 14	5	11 10 14	8	—	—	0 6 16	10	11 6	
7 17 0	10 12 17	4	11 36 14	10	—	—	0 38 17	1	1 6 17	5	12 6	
5 17 7	10 58 17	10	0 1 15	1	0 24 15	4	1 32 17	8	1 55 17	11	0	
1 17 11	11 43 18	0	0 46 15	6	1 7 15	8	2 16 18	2	2 36 18	5	14 6	
—	0 2 18	2	1 27 15	9	1 46 15	9	2 58 18	7	3 16 18	8	15 6	
2 18 2	0 41 18	2	2 4 15	9	2 21 15	8	3 35 18	9	3 51 18	9	16 6	
9 18 1	1 18 18	0	2 38 15	8	2 54 15	7	4 8 18	9	4 24 18	9	17 6	
6 17 10	1 54 17	8	3 10 15	6	3 26 15	4	4 41 18	8	4 57 18	6	18 6	
1 17 6	2 28 17	2	3 43 15	2	3 59 15	0	5 15 18	4	5 31 18	1	19 6	
6 16 10	3 4 16	5	4 16 14	9	4 34 14	5	5 48 17	10	6 6 17	7	20 6	
2 16 1	3 41 15	8	4 52 14	2	5 12 13	11	6 23 17	4	6 43 17	0	21 6	
1 15 3	4 22 14	10	5 34 13	8	5 57 13	4	7 2 16	9	7 24 16	5	22 6	
7 14 5	5 17 14	2	6 22 13	1	6 52 12	10	7 48 16	2	8 19 15	10	23 6	
8 14 0	6 21 14	0	7 28 12	9	8 6 12	9	8 56 15	8	9 34 15	7	24 6	
8 14 3	7 36 14	8	8 44 12	11	9 23 13	2	10 11 15	7	10 48 15	9	25 6	
4 15 3	8 46 15	10	10 0 13	6	10 35 13	10	11 27 15	11	—	—	26 6	
3 16 6	9 39 17	11	11 5 14	4	11 32 14	9	0 2 16	3	0 32 16	9	27 6	
4 17 8	10 29 18	3	11 54 15	1	—	—	0 59 17	3	1 24 17	9	28 6	
4 18 9	11 19 19	3	0 17 15	6	0 40 15	11	1 47 18	2	2 10 18	8	29 6	
3 19 7	—	—	1 3 16	3	1 25 16	7	2 33 19	2	2 55 19	6	1 1	
7 19 10	0 31 20	0	1 47 16	10	2 9 16	11	3 18 19	10	3 39 20	1	2 1	
5 20 1	1 20 20	0	2 30 17	0	2 51 17	0	3 59 20	3	4 21 20	3	3 1	
4 19 10	2 7 19	7	3 13 16	11	3 34 16	9	4 43 20	2	5 5 20	0	4 1	
Spring } e.		9 ft. 4 in.		8 ft. 0 in.		9 ft. 7 in.						

## Equation of Time at Noon.

S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
0	Sub.	9	7 32	Sub.	17	10 29	Sub.	25	12 42	Sub.
18		10	7 57		18	10 48		26	12 55	
56		11	8 20		19	11 7		27	13 7	
23		12	8 44		20	11 25		28	13 18	
50		13	9 6		21	11 41		29	13 29	
16		14	9 28		22	11 58		30	13 39	
42		15	9 49		23	12 13		31	13 48	
8		16	10 10		24	12 28				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
DOVER subtract 5 m. SHEERNESS subtract 3 m. LONDON 0 m.

## TIDE TABLES FOR THE

JANUARY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.				HULL.				SUNDERLAND.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.
S.	1	3 22	1 59	11 8	2 22	11 7	8 40	21 4	9 22	21 0	5 30	14 7	5 53	
M.	2	4 14	2 45	11 6	3 8	11 5	9 25	20 10	9 50	20 6	6 16	14 2	6 42	
Tu.	3	5 6	3 32	11 3	3 56	11 1	10 14	20 1	10 38	19 7	7 8	13 8	7 34	
W.	4	5 58	4 18	10 11	4 41	10 9	11 4	19 1	11 35	18 8	7 59	13 0	8 26	
Th.	5	6 50	5 8	10 7	5 37	10 5	—	—	0 10	18 2	8 57	12 4	9 30	
F.	6	7 42	6 6	10 3	6 40	10 2	0 44	17 8	1 16	17 5	10 5	11 10	10 41	
S.	7	8 36	7 21	10 2	8 2	10 2	1 50	17 3	2 27	17 4	11 20	11 8	11 54	
S.	8	9 30	8 39	10 3	9 14	10 5	3 2	17 7	3 35	17 11	—	—	0 26	
M.	9	10 24	9 47	10 7	10 19	10 9	4 8	18 4	4 39	18 9	0 58	12 3	1 29	
Tu.	10	11 17	10 47	10 11	11 13	11 1	5 5	19 1	5 30	19 5	1 58	12 10	2 25	
W.	11	morn.	11 37	11 2	11 59	11 3	5 52	19 8	6 14	19 10	2 49	13 3	3 10	
Th.	12	0 7	—	—	0 20	11 4	6 36	20 0	6 58	20 1	3 30	13 8	3 50	
F.	13	0 56	0 40	11 4	0 59	11 4	7 18	20 3	7 37	20 4	4 9	13 11	4 27	
S.	14	1 42	1 17	11 4	1 35	11 3	7 55	20 3	8 11	20 3	4 44	14 0	5 1	
S.	15	2 26	1 52	11 2	2 9	11 1	8 27	20 2	8 44	20 0	5 18	13 10	5 35	
M.	16	3 9	2 27	11 0	2 44	10 11	9 1	19 9	9 18	19 5	5 52	13 5	6 10	
Tu.	17	3 51	3 1	10 10	3 17	10 8	9 35	19 2	9 52	18 9	6 27	13 0	6 45	
W.	18	4 33	3 34	10 7	3 51	10 5	10 9	18 5	10 28	18 0	7 4	12 6	7 24	
Th.	19	5 15	4 8	10 3	4 27	10 1	10 48	17 8	11 12	17 3	7 44	11 11	8 6	
F.	20	6 0	4 47	9 11	5 9	9 9	11 38	16 10	—	—	8 29	11 4	8 53	
S.	21	6 46	5 32	9 8	6 0	9 7	0 6	16 5	0 37	16 1	9 23	10 10	9 59	
S.	22	7 35	6 34	9 6	7 14	9 6	1 11	15 11	1 45	15 10	10 36	10 8	11 12	
M.	23	8 28	7 52	9 7	8 31	9 9	2 19	15 11	2 53	16 3	11 47	10 11	—	
Tu.	24	9 22	9 7	9 11	9 42	10 2	3 29	16 10	4 4	17 6	0 21	11 3	0 54	
W.	25	10 19	10 13	10 6	10 41	10 9	4 34	18 2	5 1	18 10	1 24	12 2	1 51	
Th.	26	11 17	11 5	11 1	11 28	11 4	5 23	19 5	5 45	20 0	2 17	13 1	2 41	
F.	27	0 14	11 52	11 7	—	—	6 9	20 7	6 33	21 1	3 5	14 0	3 27	
S.	28	1 10	0 16	11 9	0 38	11 11	6 56	21 6	7 18	21 11	3 48	14 9	4 9	
S.	29	2 5	1 0	12 0	1 22	12 1	7 41	22 2	8 3	22 4	4 31	15 4	4 52	
M.	30	2 59	1 44	12 1	2 6	12 1	8 25	22 4	8 47	22 3	5 14	15 5	5 37	
Tu.	31	3 53	2 29	12 0	2 52	11 11	9 9	22 0	9 31	21 6	6 0	15 0	6 23	
Half Mean Spring Range.			5 ft. 9 in.				10 ft. 5 in.				7 ft. 2 in.			
Phases of the Moon.							Moon's Declination at Noon.							
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°
First Quarter - 4 3 42 Afternoon.							1	78	18	9	19	N.38	17	28.24
Full - - - - 11 11 0 Afternoon.							2	2	38	10	19	13	18	6 15
Last Quarter - 20 2 36 Morning.							3	2	N.10	11	17	49	19	9 53
New - - - - 27 9 30 Morning.							4	6	47	12	15	35	20	13 10
							5	10	59	13	12	39	21	15 57
In Apogee - - 17 6 0 Morning.							6	14	32	14	9	14	22	18 3
In Perigee - - 29 3 0 Morning.							7	17	15	15	5	29	23	19 17
							8	18	58	16	1	34	24	19 29

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 HARWICH subtract 5 m. HULL add 1 m. SUNDERLAND add 3

## JANUARY, 1865.

NORTH SHIELDS.										LEITH.										THURSO.										CAGE AT NOON.			
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.								
Time.		Height.			Time.		Height.			Time.		Height.			Time.		Height.			Time.		Height.			Time.		Height.						
H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.		F.	I.	
1	5	33	13	3	5	57	13	2	4	28	16	4	4	51	16	3	10	42	13	2	11	6	13	0	3	0							
2	6	20	13	1	6	45	12	10	5	14	16	1	5	40	15	10	11	32	12	8	11	58	12	4	4	6							
3	7	11	12	7	7	36	12	3	6	6	15	6	6	32	15	2	—	—		0	23	12	0	5	6								
4	8	3	11	10	8	33	11	5	6	58	14	9	7	27	14	4	0	50	11	7	1	19	11	3	9								
5	9	6	11	1	9	40	10	10	8	0	14	0	8	34	13	8	1	51	10	11	2	25	10	7	7	6							
6	10	16	10	9	10	53	10	8	9	10	13	5	9	48	13	4	3	2	10	5	3	44	10	3	8	6							
7	11	32	10	9	—	—		10	26	13	4	11	1	13	5	4	25	10	2	5	2	10	2	9	6								
8	0	8	10	10	0	40	11	0	11	33	13	7	—	—		5	35	10	3	6	6	10	6	10	6								
9	1	10	11	2	1	39	11	4	0	5	13	10	0	33	14	1	6	34	10	10	6	58	11	4	11	6							
10	2	5	11	7	2	29	11	11	0	59	14	6	1	24	14	10	7	20	11	9	7	39	12	1	12	6							
11	2	51	12	2	3	11	12	5	1	47	15	2	2	8	15	5	7	58	12	5	8	17	12	8	10								
12	3	31	12	7	3	51	12	8	2	29	15	8	2	49	15	9	8	37	12	9	8	55	12	10	14	6							
13	4	10	12	9	4	28	12	10	3	7	15	10	3	24	15	10	9	12	12	10	9	30	12	9	15	6							
14	4	46	12	9	5	4	12	8	3	41	15	9	3	58	15	8	9	48	12	8	10	5	12	6	16	6							
15	5	21	12	6	5	38	12	5	4	15	15	6	4	33	15	5	10	23	12	4	10	41	12	2	17	6							
16	5	56	12	3	6	14	12	1	4	51	15	3	5	8	15	0	10	59	11	11	11	17	11	8	18	6							
17	6	30	11	11	6	48	11	8	5	25	14	10	5	43	14	7	11	35	11	4	11	54	11	1	19	6							
18	7	6	11	5	7	25	11	2	6	2	14	3	6	22	13	11	—	—		0	13	10	9	20	6								
19	7	47	10	10	8	10	10	6	6	43	13	7	7	5	13	3	0	35	10	5	0	57	10	2	21	6							
20	8	35	10	2	9	2	9	11	7	30	12	11	7	56	12	8	1	21	9	10	1	47	9	7	22	6							
21	9	34	9	8	10	12	9	7	8	27	12	4	9	4	12	3	2	18	9	4	2	56	9	2	23	6							
22	10	48	9	7	11	24	9	9	9	42	12	2	10	18	12	2	3	37	9	1	4	16	9	1	24	6							
23	12	0	9	11	—	—		10	53	12	5	11	28	12	9	4	54	9	3	5	30	9	5	25	6								
24	0	35	10	3	1	7	10	7	—	—		0	1	13	2	6	3	9	10	6	31	10	5	26	6								
25	1	35	11	0	2	0	11	6	0	29	13	9	0	53	14	3	6	54	11	1	7	14	11	8	27	6							
26	2	22	11	11	2	44	12	5	1	16	14	10	1	39	15	5	7	33	12	4	7	53	12	11	28	6							
27	3	6	12	11	3	27	13	4	2	2	16	0	2	25	16	5	8	12	13	6	8	34	13	10	29	6							
28	3	48	13	8	4	10	14	0	2	47	16	10	3	7	17	2	8	55	14	1	9	17	14	3	30	6							
29	4	32	14	2	4	54	14	2	3	28	17	4	3	50	17	4	9	39	14	4	10	2	14	3	31	6							
30	5	17	14	1	5	41	14	0	4	12	17	3	4	35	17	1	10	25	14	1	10	49	13	11	32	6							
31	6	4	13	10	6	27	13	7	4	58	16	11	5	20	16	8	11	12	13	7	11	37	13	2	33	6							
Mean Spring Range. } 6ft. 8in.										8ft. 2in.										6ft. 7in.													

Mean Spring Range. } 6ft. 8in.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M.	S.	Sub.	M.D.	M.	S.	Sub.	M.D.	M.	S.	Sub.	M.D.	M.	S.	Sub.
4	0		9	7	32		17	10	29		25	12	42	
4	28		10	7	57		18	10	48		26	12	55	
4	56		11	8	20		19	11	7		27	13	7	
5	23		12	8	44		20	11	25		28	13	18	
5	50		13	9	6		21	11	41		29	13	29	
6	16		14	9	28		22	11	58		30	13	39	
6	42		15	9	49		23	12	13		31	13	48	
7	8		16	10	10		24	12	28					

is of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.

## TIDE TABLES FOR THE

JANUARY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
			H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.
S.	1	3 22	2 1	9 11	2 24	9 11	1 12	26 6	1 35	26 3	8 25	21 3	8 48	21 1	
M.	2	4 14	2 46	9 10	3 10	9 9	1 56	25 11	2 20	25 6	9 12	20 9	9 35	20 3	
Tu.	3	5 6	3 33	9 8	3 55	9 6	2 43	25 0	3 6	24 5	9 56	19 9	10 17	19 4	
W.	4	5 58	4 19	9 5	4 44	9 3	3 30	23 10	3 55	23 2	10 41	18 8	11 5	17 11	
Th.	5	6 50	5 12	9 1	5 40	8 10	4 26	22 6	4 58	21 10	11 29	17 3	11 57	16 11	
F.	6	7 42	6 12	8 8	6 48	8 7	5 34	21 6	6 14	21 4	—	—	0 29	16 8	
S.	7	8 36	7 28	8 6	8 6	8 7	6 57	21 5	7 35	21 7	1 11	16 6	1 54	16 7	
S.	8	9 30	8 42	8 8	9 16	8 9	8 10	21 11	8 42	22 4	2 33	16 11	3 11	17 4	
M.	9	10 24	9 49	8 10	10 18	9 0	9 12	22 10	9 38	23 4	3 45	17 10	4 17	18 4	
Tu.	10	11 17	10 44	9 1	11 9	9 2	10 3	23 10	10 25	24 2	4 46	18 10	5 12	19 3	
W.	11	morn.	11 32	9 3	11 56	9 4	10 46	24 6	11 8	24 9	5 36	19 7	6 0	19 10	
Th.	12	0 7	—	—	0 18	9 5	11 29	25 0	11 49	25 2	6 22	20 1	6 41	20 10	
F.	13	0 56	0 38	9 6	0 56	9 6	—	—	0 8	25 3	6 59	20 4	7 16	20 4	
S.	14	1 42	1 15	9 6	1 33	9 6	0 26	25 3	0 43	25 3	7 33	20 3	7 50	20 2	
S.	15	2 26	1 50	9 6	2 6	9 6	1 0	25 1	1 17	24 11	8 7	20 0	8 24	19 4	
M.	16	3 9	2 23	9 5	2 40	9 4	1 34	24 6	1 49	24 2	8 41	19 6	8 57	19 1	
Tu.	17	3 51	2 55	9 3	3 11	9 2	2 5	23 9	2 22	23 4	9 14	18 10	9 30	18 4	
W.	18	4 33	3 28	9 1	3 45	9 0	2 39	22 11	2 56	22 5	9 46	17 11	10 4	17 11	
Th.	19	5 15	4 4	8 10	4 24	8 9	3 15	21 11	3 35	21 4	10 22	17 0	10 41	16 4	
F.	20	6 0	4 45	8 7	5 7	8 5	3 57	20 9	4 21	20 3	11 0	15 11	11 23	15 1	
S.	21	6 46	5 34	8 3	6 8	8 2	4 51	19 9	5 28	19 7	11 53	15 2	—	—	
S.	22	7 35	6 43	8 1	7 18	8 0	6 7	19 6	6 47	19 8	0 25	15 0	1 0	15 4	
M.	23	8 28	7 57	8 1	8 35	8 3	7 27	20 0	8 4	20 6	1 43	15 3	2 25	15 1	
Tu.	24	9 22	9 11	8 6	9 43	8 8	8 39	21 3	9 8	22 2	3 4	16 4	3 38	17 1	
W.	25	10 19	10 11	8 11	10 36	9 1	9 34	23 1	9 56	23 11	4 9	18 1	4 36	18 11	
Th.	26	11 17	11 0	9 3	11 26	9 6	10 18	24 8	10 41	25 5	5 3	19 8	5 30	20 1	
F.	27	on 14	11 51	9 8	—	—	11 6	26 1	11 27	26 9	5 56	21 1	6 19	21 1	
S.	28	1 10	0 15	9 11	0 38	10 1	11 49	27 3	—	—	6 41	22 2	7 3	22 4	
S.	29	2 5	1 1	10 2	1 24	10 3	0 12	27 7	0 35	27 10	7 25	22 8	7 47	22 1	
M.	30	2 59	1 46	10 3	2 9	10 3	0 57	27 10	1 20	27 9	8 9	22 6	8 32	22 1	
Tu.	31	3 53	2 31	10 3	2 52	10 2	1 42	27 5	2 3	26 10	8 54	21 10	9 17	21 1	
Half Mean Spring } Range.			4 ft. 10 in.				13 ft. 0 in.				10 ft. 6 in.				
Phases of the Moon.							Moon's Declination at Noon.								
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter - 4 3 42 Afternoon.							1	7	8.18	9	19	N. 38	17	2	8.24
Full - - - - 11 11 0 Afternoon.							2	2	38	10	19	13	18	6	15
Last Quarter - 20 2 36 Morning.							3	2	N. 10	11	17	49	19	9	53
New - - - - 27 9 30 Morning.							4	6	47	12	15	35	20	13	10
							5	10	59	13	12	39	21	15	57
In Apogee - - 17 6 0 Morning.							6	14	32	14	9	14	22	18	3
In Perigee - - 29 3 0 Morning.							7	17	15	15	5	29	23	19	17
							8	18	58	16	1	34	24	19	29

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, —  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

## JANUARY, 1865.

M. D.	M. S.	WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age at Noon.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.
1	9	6 38	0	9 27 37	9	—	—	0 23 16	1	1 2 11	0	1 25 10	11	3.6
2	9	48 37	2	10 10 36	5	0 48 15	11	1 14 15	8	1 49 10	9	2 14 10	7	4.6
3	10	27 35	7	10 46 34	7	1 40 15	4	2 5 15	0	2 40 10	5	3 5 10	3	5.6
4	11	8 33	7	11 33 32	7	2 31 14	8	3 0 14	4	3 30 10	1	3 58 9	11	6
5	12	0 31	7	—	—	3 32 14	0	4 6 13	8	4 31 9	8	5 4 9	5	7.6
6	0	32 30	11	1 7 30	6	4 43 13	6	5 21 13	5	5 37 9	4	6 10 9	3	8.6
7	1	48 30	4	2 28 30	5	6 0 13	5	6 35 13	6	6 47 9	4	7 22 9	5	9.6
8	3	7 30	9	3 45 31	3	7 7 13	8	7 38 13	10	7 55 9	6	8 28 9	8	10.6
9	4	23 32	0	4 56 32	10	8 8 14	2	8 34 14	5	9 1 9	10	9 31 10	0	11.6
10	5	27 33	8	5 53 34	4	8 58 14	8	9 20 14	11	9 58 10	2	10 20 10	3	12.6
11	6	18 34	10	6 42 35	3	9 41 15	2	10 2 15	3	10 39 10	5	10 59 10	7	0
12	7	4 35	7	7 24 35	11	10 22 15	5	10 40 15	6	11 19 10	8	11 38 10	9	14.6
13	7	43 36	3	8 0 36	2	10 56 15	7	11 12 15	6	11 56 10	9	—	—	15.6
14	8	17 36	2	8 33 36	0	11 29 15	5	11 46 15	4	0 14 10	8	0 32 10	7	16.6
15	8	49 35	10	9 5 35	6	—	—	0 4 15	3	0 49 10	6	1 7 10	5	17.6
16	9	20 35	2	9 35 34	8	0 22 15	1	0 40 14	10	1 25 10	4	1 42 10	2	18.6
17	9	49 34	1	10 4 33	5	0 58 14	8	1 17 14	4	1 59 10	0	2 17 9	11	19.6
18	10	18 32	8	10 33 31	11	1 36 14	1	1 55 13	10	2 36 9	9	2 55 9	7	20.6
19	10	50 31	1	11 8 30	2	2 16 13	6	2 38 13	3	3 15 9	5	3 37 9	3	21.6
20	11	28 29	4	11 54 28	7	3 2 12	11	3 28 12	7	4 0 9	1	4 26 8	11	0
21	—	—	—	0 27 28	1	3 59 12	4	4 37 12	3	4 57 8	9	5 32 8	8	23.6
22	1	2 27	9	1 38 27	10	5 15 12	3	5 51 12	4	6 6 8	8	6 40 8	9	24.6
23	2	17 28	2	2 57 28	10	6 27 12	7	7 2 12	10	7 14 8	11	7 49 9	12	25.6
24	3	37 29	10	4 14 31	0	7 35 13	3	8 4 13	9	8 24 9	4	8 55 9	7	26.6
25	4	48 32	4	5 17 33	8	8 30 14	3	8 52 14	9	9 24 9	11	9 50 10	10	27.6
26	5	44 34	11	6 11 36	3	9 14 15	3	9 36 15	8	10 13 10	5	10 34 10	9	28.6
27	6	37 37	3	7 1 38	2	9 58 16	1	10 20 16	6	10 56 11	0	11 17 11	3	0
28	7	24 39	0	7 46 39	8	10 40 16	9	11 0 17	0	11 38 11	5	12 0 11	6	1.1
29	8	8 40	0	8 30 40	0	11 20 17	1	11 42 17	1	—	—	0 23 11	6	2.1
30	8	52 39	11	9 13 39	7	—	—	0 6 17	0	0 46 11	6	1 9 11	5	3.1
31	9	33 39	0	9 53 38	3	0 30 16	10	0 54 16	6	1 33 11	3	1 56 11	1	4.1
Half Mean Spring Range.		18 ft. 7 in.				8 ft. 0 in.				5 ft. 6 in.				

## Equation of Time at Noon.

M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
1	4 0	Sub.	9	7 32	Sub.	17	10 29	Sub.	25	12 42	Sub.
2	4 28		10	7 57		18	10 48		26	12 55	
3	4 56		11	8 20		19	11 7		27	13 7	
4	5 23		12	8 44		20	11 25		28	13 18	
5	5 50		13	9 6		21	11 41		29	13 29	
6	6 16		14	9 28		22	11 58		30	13 39	
7	6 42		15	9 49		23	12 13		31	13 48	
8	7 8		16	10 10		24	12 28				

times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time



## TIDE TABLES FOR THE

JANUARY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
			H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	
S.	1	3 22	0 38	9 7	1 2	9 6	10 7	7 7	10 28	7 6	7 29	11 0	7 52	10 10	
M.	2	4 14	1 27	9 5	1 53	9 4	10 53	7 4	11 20	7 1	8 16	10 7	8 41	10 3	
Tu.	3	5 6	2 21	9 3	2 47	9 1	11 49	6 10	—	—	9 6	10 0	9 35	9 9	
W.	4	5 58	3 14	8 11	3 42	8 10	0 21	6 7	0 57	6 4	10 6	9 6	10 40	9 3	
Th.	5	6 50	4 13	8 8	4 45	8 6	1 37	6 2	2 17	6 1	11 15	9	11 50	9 0	
F.	6	7 42	5 17	8 5	5 51	8 4	2 54	6 1	3 29	6 3	—	—	0 26	8 11	
S.	7	8 36	6 30	8 3	7 7	8 3	4 4	6 4	4 35	6 6	1 4	8 11	1 40	9 0	
S.	8	9 30	7 41	8 4	8 13	8 5	5 2	6 7	5 28	6 8	2 14	9 1	2 45	9 3	
M.	9	10 24	8 42	8 7	9 8	8 10	5 53	6 9	6 18	6 11	3 13	9 6	3 38	9 10	
Tu.	10	11 17	9 33	9 0	9 56	9 1	6 43	7 0	7 7	7 2	4 0	10 1	4 22	10 4	
W.	11	morn.	10 17	9 2	10 38	9 3	7 29	7 3	7 52	7 4	4 43	10 6	5 5	10 8	
Th.	12	0 7	10 58	9 3	11 17	9 3	8 12	7 5	8 30	7 6	5 27	10 10	5 46	10 11	
F.	13	0 56	11 34	9 3	11 50	9 3	8 47	7 6	9 2	7 5	6 4	10 11	6 20	10 10	
S.	14	1 42	—	—	0 7	9 3	9 18	7 4	9 34	7 3	6 37	10 9	6 55	10 8	
S.	15	2 26	0 25	9 3	0 43	9 2	9 50	7 2	10 6	7 0	7 12	10 6	7 29	10 3	
M.	16	3 9	1 1	9 1	1 19	9 0	10 22	6 11	10 38	6 9	7 46	10 1	8 2	9 10	
Tu.	17	3 51	1 37	8 11	1 56	8 11	10 55	6 7	11 15	6 5	8 18	9 7	8 36	9 4	
W.	18	4 33	2 16	8 10	2 37	8 8	11 38	6 2	—	—	8 56	9 1	9 18	8 11	
Th.	19	5 15	2 58	8 6	3 20	8 5	0 3	6 0	0 32	5 9	9 43	8 8	10 9	8 6	
F.	20	6 0	3 44	8 3	4 9	8 2	1 1	5 7	1 33	5 6	10 37	8 3	11 9	8 2	
S.	21	6 46	4 38	8 1	5 13	8 0	2 10	5 5	2 49	5 5	11 44	8 1	—	—	
S.	22	7 35	5 47	7 11	6 21	7 11	3 25	5 7	3 58	5 9	0 19	8 1	0 55	8 3	
M.	23	8 28	6 59	7 11	7 35	8 0	4 30	5 11	4 59	6 1	1 32	8 3	2 8	8 6	
Tu.	24	9 22	8 9	8 2	8 38	8 5	5 26	6 4	5 50	6 7	2 42	8 10	3 9	9 3	
W.	25	10 19	9 3	8 8	9 26	8 11	6 13	6 10	6 36	7 1	3 34	9 8	3 54	10 1	
Th.	26	11 17	9 49	9 2	10 12	9 4	6 59	7 4	7 24	7 7	4 15	10 6	4 38	10 11	
F.	27	0 14	10 34	9 6	10 56	9 8	7 48	7 9	8 10	8 0	5 1	11 3	5 24	11 7	
S.	28	1 10	11 17	9 9	11 38	9 10	8 30	8 2	8 50	8 3	5 46	11 10	6 7	12 0	
S.	29	2 5	11 58	9 10	—	—	9 10	8 3	9 31	8 2	6 28	12 0	6 51	11 11	
M.	30	2 59	0 21	9 10	0 45	9 10	9 53	8 1	10 14	7 11	7 14	11 9	7 37	11 7	
Tu.	31	3 53	1 9	9 9	1 32	9 8	10 35	7 9	10 58	7 7	7 59	11 3	8 21	10 11	
Half Mean Spring Range.			4 ft. 9 in.				3 ft. 10 in.				5 ft. 7 in.				
Phases of the Moon.							Moon's Declination at Noon.								
			D.	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter -	4	3 42	Afternoon.			1	7	8	18	9	19	N. 38	17	2	8.24
Full - - - -	11	11 0	Afternoon.			2	2	38	10	19	13	18	6	15	26 16 24
Last Quarter -	20	2 36	Morning.			3	2	N. 10	11	17	49	19	9	53	27 13 11
New - - - -	27	9 30	Morning.			4	6	47	12	15	35	20	13	10	28 9 5
						5	10	59	13	12	39	21	15	57	29 4 25
In Perigee -	17	6 0	Morning.			6	14	32	14	9	14	22	18	3	30 0 30
In Apogee -	29	3 0	Morning.			7	17	15	15	5	29	23	19	17	31 5 19
						8	18	58	16	1	34	24	19	29	

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required, —

BELFAST subtract 2 m.

LONDONDERRY add 4 m.

SLIGO BAY add 9 m.

JANUARY, 1865.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age AT NOON.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		
1	6 51 15 0	7 14 14 10	7 17 11 11	7 39 11 9	7 38 12 9	8 0 12 8	3.6								
2	7 39 14 6	8 5 14 2	8 3 11 7	8 26 11 4	8 22 12 6	8 44 12 4	4.6								
3	8 30 13 9	8 55 13 3	8 46 11 1	9 8 10 9	9 3 12 1	9 24 11 10	5.6								
4	9 22 12 9	9 52 12 4	9 33 10 6	9 58 10 3	9 47 11 6	10 15 11 2	6.6								
5	10 24 12 0	10 58 11 10	10 25 10 0	10 57 9 9	10 46 10 10	11 18 10 7	7.6								
6	11 36 11 8	—	11 33 9 8	—	11 51 10 5	—	8.6								
7	0 16 11 9	0 52 11 10	0 14 9 7	0 52 9 8	0 27 10 4	1 3 10 5	9.6								
8	1 25 12 0	1 56 12 3	1 30 9 9	2 7 9 11	1 39 10 6	2 16 10 8	10.6								
9	2 25 12 6	2 53 12 10	2 41 10 2	3 11 10 4	2 53 10 11	3 26 11 2	11.6								
0	3 20 13 2	3 42 13 5	3 38 10 7	4 3 10 10	3 56 11 5	4 22 11 7	12.6								
1	4 3 13 8	4 25 13 11	4 26 11 0	4 48 11 2	4 47 11 9	5 11 11 10	13.6								
2	4 45 14 1	5 4 14 3	5 10 11 3	5 30 11 4	5 33 11 11	5 51 12 0	14.6								
3	5 22 14 4	5 40 14 4	5 49 11 5	6 7 11 5	6 9 12 1	6 28 12 1	15.6								
4	5 58 14 3	6 16 14 2	6 25 11 5	6 42 11 4	6 46 12 1	7 3 12 1	16.6								
5	6 33 14 0	6 50 13 10	6 59 11 3	7 16 11 2	7 20 12 0	7 37 11 11	17.6								
6	7 7 13 7	7 24 13 4	7 32 11 0	7 48 10 18	7 53 11 10	8 8 11 9	18.6								
7	7 42 13 1	8 1 12 9	8 4 10 7	8 20 10 5	8 23 11 7	8 38 11 5	19.6								
8	8 20 12 4	8 40 12 0	8 36 10 2	8 55 10 0	8 54 11 2	9 11 11 0	20.6								
9	9 1 11 7	9 23 11 2	9 14 9 9	9 33 9 6	9 28 10 9	9 47 10 6	21.6								
0	9 47 10 10	10 17 10 7	9 53 9 3	10 18 9 0	10 10 10 3	10 40 9 11	22.6								
1	10 53 10 6	11 30 10 5	10 52 8 11	11 28 8 10	11 14 9 9	11 47 9 7	23.6								
2	—	0 7 10 6	—	0 4 8 10	—	0 21 9 7	24.6								
3	0 44 10 9	1 20 11 1	0 42 9 0	1 21 9 2	0 55 9 9	1 31 9 11	25.6								
4	1 53 11 7	2 21 12 1	2 1 9 6	2 34 9 10	2 9 10 3	2 45 10 8	26.6								
5	2 48 12 8	3 12 13 2	3 3 10 3	3 30 10 8	3 18 11 0	3 46 11 5	27.6								
6	3 35 13 9	3 58 14 3	3 55 11 0	4 20 11 5	4 14 11 9	4 41 12 2	28.6								
7	4 21 14 9	4 43 15 3	4 44 11 9	5 7 12 1	5 7 12 5	5 30 12 8	29.6								
8	5 5 15 8	5 27 15 11	5 30 12 4	5 53 12 6	5 52 12 11	6 14 13 2	30.6								
9	5 49 16 1	6 12 16 0	6 16 12 7	6 38 12 7	6 36 13 3	6 59 13 3	31.6								
0	6 35 15 11	6 58 15 9	7 1 12 6	7 24 12 5	7 22 13 3	7 45 13 3	32.6								
1	7 21 15 5	7 44 15 0	7 46 12 2	8 8 11 11	8 6 13 1	8 27 12 10	33.6								
at Mean Spring } Range. }					5ft 10in.					6ft. 2in.					

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
4 0	Sub.	9	7 32	Sub.	17	10 29	Sub.	25	12 42	Sub.
4 28		10	7 57		18	10 48		25	12 55	
4 56		11	8 20		19	11 7		27	13 7	
5 23		12	8 44		20	11 25		28	13 18	
5 50		13	9 6		21	11 41		29	13 29	
6 16		14	9 28		22	11 58		30	13 39	
6 42		15	9 49		23	12 13		31	13 48	
7 8		16	10 10		24	12 28				

Notes of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.

## FEBRUARY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
			H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.																						
W.	1	4 46	7 11	18 9	7 35	17 11	9 7	15 7	9 27	14 10	2 50	12 11	3 12	1 1	3 12	1 1	3 12	1 1	3 12	1 1																					
Th.	2	5 39	7 59	17 0	8 23	16 2	9 49	14 8	10 12	14 0	3 35	12 3	3 58	1 1	3 58	1 1	3 58	1 1	3 58	1 1																					
F.	3	6 33	8 51	15 4	9 21	14 9	10 36	13 7	11 3	13 3	4 21	11 5	4 47	1 1	4 47	1 1	4 47	1 1	4 47	1 1																					
S.	4	7 27	9 59	14 3	10 40	14 0	11 34	12 9	—	—	5 17	10 7	5 52	1 1	5 52	1 1	5 52	1 1	5 52	1 1																					
S.	5	8 20	11 27	13 11	—	—	0 8	12 8	0 47	12 4	6 31	10 2	7 16	1 1	7 16	1 1	7 16	1 1	7 16	1 1																					
M.	6	9 12	0 10	14 0	0 48	14 4	1 28	12 8	2 8	12 6	7 57	10 2	8 37	1 1	8 37	1 1	8 37	1 1	8 37	1 1																					
Tu.	7	10 3	1 21	14 10	1 52	15 5	2 48	13 2	3 22	13 0	9 12	10 9	9 41	1 1	9 41	1 1	9 41	1 1	9 41	1 1																					
W.	8	10 51	2 18	16 0	2 41	16 7	3 53	13 11	4 21	13 8	10 12	11 4	10 36	1 1	10 36	1 1	10 36	1 1	10 36	1 1																					
Th.	9	11 38	3 0	17 1	3 19	17 8	4 45	14 7	5 8	14 2	10 56	11 9	11 15	1 1	11 15	1 1	11 15	1 1	11 15	1 1																					
F.	10	morn.	3 38	18 0	3 56	18 3	5 29	15 0	5 49	14 6	11 34	12 1	11 52	1 1	11 52	1 1	11 52	1 1	11 52	1 1																					
S.	11	0 22	4 12	18 6	4 29	18 7	6 7	15 3	6 24	14 9	—	—	0 8	1 1	0 8	1 1	0 8	1 1	0 8	1 1																					
S.	12	1 6	4 45	18 8	5 0	18 8	6 41	15 5	6 58	14 10	0 25	12 5	0 43	1 1	0 43	1 1	0 43	1 1	0 43	1 1																					
M.	13	1 48	5 16	18 7	5 32	18 5	7 12	15 3	7 26	14 8	0 59	12 4	1 16	1 1	1 16	1 1	1 16	1 1	1 16	1 1																					
Tu.	14	2 30	5 46	18 3	6 0	18 0	7 40	14 10	7 53	14 4	1 32	12 3	1 47	1 1	1 47	1 1	1 47	1 1	1 47	1 1																					
W.	15	3 12	6 15	17 8	6 31	17 3	8 8	14 4	8 24	13 10	2 2	12 1	2 17	1 1	2 17	1 1	2 17	1 1	2 17	1 1																					
Th.	16	3 55	6 48	16 10	7 5	16 4	8 39	13 8	8 52	13 5	2 33	11 9	2 49	1 1	2 49	1 1	2 49	1 1	2 49	1 1																					
F.	17	4 40	7 23	15 9	7 43	15 2	9 6	13 2	9 23	12 10	3 5	11 5	3 23	1 1	3 23	1 1	3 23	1 1	3 23	1 1																					
S.	18	5 27	8 4	14 6	8 28	13 11	9 43	12 7	10 4	12 4	3 42	10 11	4 2	1 1	4 2	1 1	4 2	1 1	4 2	1 1																					
S.	19	6 17	8 58	13 6	9 32	13 2	10 30	12 0	11 0	12 0	4 25	10 4	4 54	1 1	4 54	1 1	4 54	1 1	4 54	1 1																					
M.	20	7 9	10 12	13 1	10 55	13 2	11 33	11 8	—	—	5 26	9 10	6 4	1 1	6 4	1 1	6 4	1 1	6 4	1 1																					
Tu.	21	8 3	11 41	13 6	—	—	0 13	12 0	0 57	11 10	6 45	9 8	7 29	1 1	7 29	1 1	7 29	1 1	7 29	1 1																					
W.	22	8 59	0 24	14 1	1 1	14 11	1 41	12 7	2 22	12 6	8 11	10 3	8 51	1 1	8 51	1 1	8 51	1 1	8 51	1 1																					
Th.	23	9 55	1 32	15 9	2 0	16 9	3 1	13 7	3 36	13 7	9 23	11 3	9 52	1 1	9 52	1 1	9 52	1 1	9 52	1 1																					
F.	24	10 52	2 26	17 9	2 48	18 9	4 6	14 9	4 34	14 3	10 20	12 2	10 44	1 1	10 44	1 1	10 44	1 1	10 44	1 1																					
S.	25	11 48	3 9	19 8	3 31	20 5	5 1	15 8	5 27	15 6	11 6	13 0	11 27	1 1	11 27	1 1	11 27	1 1	11 27	1 1																					
S.	26	0 44	3 53	20 11	4 15	21 3	5 50	16 5	6 14	16 2	11 49	13 7	—	1 1	—	1 1	—	1 1	—	1 1																					
M.	27	1 40	4 37	21 5	5 0	21 5	6 38	16 11	7 1	16 7	0 12	13 9	0 35	1 1	0 35	1 1	0 35	1 1	0 35	1 1																					
Tu.	28	2 35	5 22	21 4	5 44	21 0	7 22	16 10	7 43	16 4	0 59	13 9	1 22	1 1	1 22	1 1	1 22	1 1	1 22	1 1																					
Half Mean Spring } Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
			D. H. M.						M.D.			°			M.D.			°			M.D.			°			M.D.			°											
First Quarter-			3	1	9	Morning.			1	9	N. 45	9	13	N. 33	17	14	S. 51	25	1	25	1	25	1	25	1	25	1	25	1												
Full - - - -			10	4	27	Afternoon.			2	13	32	10	10	20	18	17	9	26	1	26	1	26	1	26	1	26	1	26	1												
Last Quarter-			18	9	38	Afternoon.			3	16	28	11	6	43	19	18	41	27	1	27	1	27	1	27	1	27	1	27	1												
New - - - -			25	8	3	Afternoon.			4	18	26	12	2	52	20	19	18	28	1	28	1	28	1	28	1	28	1	28	1												
									5	19	22	13	1	S. 3	21	18	53																								
In Apogee - -			13	9	0	Afternoon.			6	19	16	14	4	55	22	17	21																								
In Perigee - -			26	0	0	Noon.			7	18	11	15	8	36	23	14	41																								
									8	16	14	16	11	57	24	11	2																								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 4 m.

## FEBRUARY, 1865.

DOVER.						SHEERNESS.						LONDON.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
M. P. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		
30 19 3	2 53 18	9	3 56 16	6	4	4 19 16	2	5 27 19	9	5 49 19	6	5 49 19	6	5 49 19	6	5 49 19	6	
16 18 1	3 39 17	5	4 41 15	9	5	5 5 15	3	6 12 19	1	6 37 18	7	6 37 18	7	6 37 18	7	6 37 18	7	
2 16 9	4 27 16	1	5 29 14	10	5	5 55 14	5	7 0 18	0	7 24 17	6	7 24 17	6	7 24 17	6	7 24 17	6	
54 15 5	5 27 14	11	6 26 14	0	7	7 0 13	6	7 54 17	1	8 29 16	7	8 29 16	7	8 29 16	7	8 29 16	7	
2 14 7	6 42 14	6	7 39 13	4	8	8 22 13	3	9 8 16	3	9 48 16	0	9 48 16	0	9 48 16	0	9 48 16	0	
23 14 9	8 3 15	1	9 7 13	4	9	9 48 13	6	10 31 15	11	11 15 16	0	11 15 16	0	11 15 16	0	11 15 16	0	
37 15 6	9 7 15	11	10 25 13	9	10	10 57 14	0	11 53 16	2	—	—	—	—	—	—	—	—	
35 16 4	9 59 16	9	11 26 14	4	11	11 51 14	7	0 28 16	5	0 56 16	9	0 56 16	9	0 56 16	9	0 56 16	9	
21 17 1	10 42 17	5	—	—	—	0 13 14	11	1 20 17	1	1 43 17	6	1 43 17	6	1 43 17	6	1 43 17	6	
2 17 9	11 22 18	0	0 33 15	2	0	0 51 15	4	2 4 17	9	2 23 18	1	2 23 18	1	2 23 18	1	2 23 18	1	
41 18 2	11 59 18	3	1 11 15	7	1	1 29 15	9	2 40 18	4	2 59 18	7	2 59 18	7	2 59 18	7	2 59 18	7	
—	—	—	0 16 18	4	1	1 45 15	10	2 1 15	11	3 15 18	9	3 15 18	9	3 15 18	9	3 15 18	9	
33 18 4	0 51 18	4	2 17 15	10	2	2 32 15	10	3 47 18	11	4 1 18	11	4 1 18	11	4 1 18	11	4 1 18	11	
8 18 3	1 24 18	1	2 48 15	9	3	3 2 15	8	4 18 18	11	4 33 18	10	4 33 18	10	4 33 18	10	4 33 18	10	
40 17 11	1 56 17	9	3 16 15	7	3	3 30 15	5	4 48 18	9	5 3 18	6	5 3 18	6	5 3 18	6	5 3 18	6	
13 17 5	2 30 17	2	3 45 15	2	4	4 1 14	11	5 17 18	4	5 32 18	12	5 32 18	12	5 32 18	12	5 32 18	12	
47 16 9	3 4 16	4	4 18 14	8	4	4 35 14	5	5 48 17	10	6 6 17	7	6 6 17	7	6 6 17	7	6 6 17	7	
23 15 11	3 43 15	5	4 53 14	1	5	5 13 13	9	6 23 17	3	6 43 16	11	6 43 16	11	6 43 16	11	6 43 16	11	
6 14 11	4 32 14	6	5 36 13	6	6	6 2 13	2	7 6 16	6	7 33 16	2	7 33 16	2	7 33 16	2	7 33 16	2	
3 14 1	5 37 13	11	6 34 12	10	7	7 12 12	8	8 2 15	10	8 37 15	7	8 37 15	7	8 37 15	7	8 37 15	7	
5 15 13	6 55 14	3	7 53 12	8	8	8 37 12	10	9 20 15	6	10 4 15	6	10 4 15	6	10 4 15	6	10 4 15	6	
7 37 14	8 16 15	6	9 20 13	2	10	10 1 13	7	10 46 15	8	11 28 16	6	11 28 16	6	11 28 16	6	11 28 16	6	
3 47 16	9 15 17	0	10 37 14	0	11	11 7 14	7	—	—	0 4 16	6	0 4 16	6	0 4 16	6	0 4 16	6	
2 43 17	10 8 18	5	11 34 15	1	11	11 59 15	7	0 34 17	0	0 59 17	7	0 59 17	7	0 59 17	7	0 59 17	7	
3 32 19	10 56 19	8	—	—	0	0 21 16	1	1 23 18	2	1 49 18	9	1 49 18	9	1 49 18	9	1 49 18	9	
1 20 20	11 45 20	5	0 42 16	6	1	1 4 16	10	2 13 19	4	2 34 19	10	2 34 19	10	2 34 19	10	2 34 19	10	
—	0 9 20	7	1 26 17	2	1	1 48 17	4	2 56 20	2	3 19 20	6	3 19 20	6	3 19 20	6	3 19 20	6	
3 33 20	0 57 20	7	2 9 17	5	2	2 31 17	5	3 41 20	8	4 1 20	8	4 1 20	8	4 1 20	8	4 1 20	8	
Mean Spring range.			9 ft. 4 in.			8 ft. 0 in.			9 ft. 7 in.									

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
3 56	Sub.	9	14 31	Sub.	17	14 15	Sub.	25	13 16	Sub.
4 3		10	14 31		18	14 10		26	13 6	
4 9		11	14 31		19	14 4		27	12 55	
4 15		12	14 30		20	13 58		28	12 44	
4 20		13	14 29		21	13 51				
4 24		14	14 26		22	13 43				
4 27		15	14 23		23	13 35				
4 29		16	14 20		24	13 26				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
DOVER subtract 5 m.      SHEERNESS subtract 3 m.      LONDON 0 m.

# TIDE TABLES FOR THE

FEBRUARY, 1865.

WEEK DAY.		MONTH DAY.		MOON'S TRANSIT.	HARWICH.												HULL.												SUNDERLAND.											
					MORNING.						AFTERNOON.						MORNING.						AFTERNOON.						MORNING.						AFTERNOON.					
					Time.			Height.			Time.			Height.			Time.			Height.			Time.			Height.			Time.			Height.								
		H.	M.	F.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.								
W.	1	4	44	6	3	14	11	8	3	37	11	6	9	54	21	0	10	17	20	6	47	14	4	7	11	13	11	1	11	32	11	1								
Th.	2	5	39	3	59	11	3	4	21	11	0	10	41	19	9	11	6	19	1	7	36	13	6	8	1	12	11	2	10	10	11	4								
F.	3	6	33	4	43	10	9	5	9	10	6	11	36	18	5	—	—	—	—	8	28	12	5	8	58	12	3	10	10	11	4									
S.	4	7	27	5	37	10	3	6	7	10	0	0	9	17	9	0	45	17	2	9	31	11	7	10	10	11	4	10	10	11	4									
S.	5	8	20	6	45	9	11	7	30	9	10	1	22	16	9	1	59	16	6	10	50	11	1	11	32	11	1	11	32	11	1									
M.	6	9	12	8	15	9	10	8	55	9	11	2	39	16	7	3	17	16	10	—	—	—	—	—	—	—	—	—	—	—	—	—								
Tu.	7	10	3	9	32	10	1	10	4	10	3	3	53	17	3	4	26	17	9	0	44	11	6	1	16	11	10	1	16	11	10									
W.	8	10	51	10	35	10	6	11	2	10	8	4	55	18	3	5	20	18	8	1	45	12	3	2	13	12	7	2	13	12	7									
Th.	9	11	38	11	25	10	11	11	46	11	1	5	42	19	0	6	1	19	4	2	37	12	10	2	58	13	1	2	58	13	1									
F.	10	morn.	—	—	—	—	—	0	5	11	2	6	21	19	8	6	41	19	11	3	16	13	4	3	34	13	7	4	34	13	7									
S.	11	0	22	0	24	11	3	0	42	11	4	7	0	20	2	7	16	20	4	3	51	13	10	4	8	14	0	4	8	14	0									
S.	12	1	6	0	57	11	5	1	13	11	5	7	32	20	5	7	49	20	6	4	24	14	1	4	40	14	2	4	40	14	2									
M.	13	1	48	1	30	11	5	1	46	11	4	8	5	20	6	8	21	20	5	4	55	14	2	5	11	14	3	5	11	14	3									
Tu.	14	2	30	2	2	11	3	2	18	11	2	8	36	20	4	8	51	20	2	5	26	13	11	5	41	13	9	5	41	13	9									
W.	15	3	12	2	33	11	1	2	48	11	0	9	5	19	10	9	21	19	6	5	56	13	6	6	12	13	3	6	12	13	3									
Th.	16	3	55	3	3	10	10	3	19	10	8	9	38	19	2	9	54	18	9	6	29	13	0	6	47	12	8	6	47	12	8									
F.	17	4	40	3	36	10	6	3	52	10	4	10	10	18	4	10	29	17	11	7	5	12	5	7	25	12	1	7	25	12	1									
S.	18	5	27	4	9	10	2	4	28	10	0	10	49	17	5	11	15	16	11	7	46	11	9	8	9	11	5	8	9	11	5									
S.	19	6	17	4	50	9	10	5	14	9	8	11	44	16	6	—	—	—	—	8	34	11	1	9	6	10	10	1	9	6	10	10								
M.	20	7	9	5	44	9	6	6	18	9	5	0	19	16	1	0	56	15	9	9	43	10	8	10	23	10	7	10	23	10	7									
Tu.	21	8	3	7	0	9	5	7	45	9	7	1	33	15	9	2	12	15	10	11	4	10	8	11	45	10	11	11	45	10	11									
W.	22	8	59	8	28	9	9	9	8	10	0	2	51	16	3	3	30	17	0	—	—	—	—	—	—	—	—	—	—	—	—	—								
Th.	23	9	55	9	44	10	4	10	15	10	8	4	6	17	9	4	36	18	7	0	56	11	11	1	26	12	6	1	26	12	6									
F.	24	10	52	10	44	11	0	11	10	11	4	5	3	19	5	5	27	20	2	1	54	13	1	2	22	13	7	2	22	13	7									
S.	25	11	48	11	33	11	8	11	55	12	0	5	49	20	10	6	11	21	6	2	45	14	2	3	7	14	8	3	7	14	8									
S.	26	on	44	—	—	—	—	—	17	12	2	6	34	22	0	6	57	22	5	3	28	15	1	3	49	15	5	3	49	15	5									
M.	27	1	40	0	39	12	4	1	1	12	5	7	20	22	9	7	42	22	11	4	11	15	9	4	32	15	11	4	32	15	11									
Tu.	28	2	35	1	23	12	5	1	46	12	4	8	5	22	11	8	27	22	10	4	54	15	11	5	16	15	9	5	16	15	9									
Half Mean Spring Range.					5ft. 9in.					10ft. 5in.					7ft. 2in.																									
Phases of the Moon.										Moon's Declination at Noon.																														
D. H. M.										M.D. ° ' "										M.D. ° ' "										M.D. ° ' "										
First Quarter 3 1 9 Morning.										1 9 N. 45 9 13 N. 33 17 14 S. 51 25 68.36										1 9 N. 45 9 13 N. 33 17 14 S. 51 25 68.36										1 9 N. 45 9 13 N. 33 17 14 S. 51 25 68.36										
Full - - - 10 4 27 Afternoon.										2 13 32 10 10 20 18 17 9 26 1 43										2 13 32 10 10 20 18 17 9 26 1 43										2 13 32 10 10 20 18 17 9 26 1 43										
Last Quarter 18 9 38 Afternoon.										3 16 28 11 6 43 19 18 41 27 3 N. 17										3 16 28 11 6 43 19 18 41 27 3 N. 17										3 16 28 11 6 43 19 18 41 27 3 N. 17										
New - - - 25 8 3 Afternoon.										4 18 26 12 2 52 20 19 18 28 8 1										4 18 26 12 2 52 20 19 18 28 8 1										4 18 26 12 2 52 20 19 18 28 8 1										
										5 19 22 13 1 S. 3 21 18 53										5 19 22 13 1 S. 3 21 18 53										5 19 22 13 1 S. 3 21 18 53										
In Apogee - 13 9 0 Afternoon.										6 19 16 14 4 55 22 17 21										6 19 16 14 4 55 22 17 21										6 19 16 14 4 55 22 17 21										
In Perigee - 26 0 0 Noon.										7 18 11 15 8 36 23 14 41										7 18 11 15 8 36 23 14 41										7 18 11 15 8 36 23 14 41										
										8 16 14 16 11 57 24 11 2										8 16 14 16 11 57 24 11 2										8 16 14 16 11 57 24 11 2										

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
**HARWICH** subtract 5 m.      **HULL** add 1 m.      **SUNDERLAND** add 5 m.

## FEBRUARY, 1865.

WEEK DAY.	MON. DAY.	NORTH SHIELDS.				LEITH.				THURSO.				C's AGE AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	
1		6 50 13 3	7 13 12 11	5 44 16 4	6 9 15 11	—	—	0 1 12 8	5.1					
2		7 38 12 5	8 5 11 10	6 35 15 4	7 1 14 8	0 26 12 2	0 52 11 7	6.1						
3		8 33 11 3	9 5 10 10	7 28 14 2	8 0 13 8	1 19 11 1	1 50 10 7	7.1						
4		9 41 10 5	10 22 10 2	8 35 13 2	9 15 12 11	2 26 10 2	3 7 9 10	8.1						
5		11 3 10 1	11 45 10 2	9 57 12 9	10 38 12 9	3 53 9 8	4 38 9 6	9.1						
6		—	0 24 10 3	11 17 12 10	11 51 13 1	5 18 9 6	5 52 9 9	10.1						
7		0 58 10 6	1 28 10 9	—	0 22 13 4	6 24 10 1	6 50 10 6	11.1						
8		1 55 11 0	2 19 11 4	0 49 13 9	1 13 14 2	7 12 11 0	7 32 11 5	12.1						
9		2 41 11 8	3 0 12 0	1 36 14 7	1 56 15 0	7 49 11 10	8 4 12 3	13.1						
10		3 17 12 3	3 35 12 6	2 15 15 4	2 33 15 7	8 21 12 7	8 38 12 10	14.1						
11		3 52 12 9	4 8 12 10	2 51 15 10	3 6 15 11	8 54 12 11	9 9 12 11	15.1						
12		4 24 12 11	4 41 12 11	3 21 16 0	3 36 16 0	9 25 12 11	9 41 12 10	16.1						
13		4 57 12 10	5 14 12 9	3 52 15 11	4 8 15 9	9 58 12 9	10 14 12 8	17.1						
14		5 30 12 8	5 44 12 6	4 24 15 8	4 39 15 6	10 29 12 6	10 45 12 3	18.1						
15		6 0 12 3	6 16 12 1	4 55 15 3	5 10 15 11	1 12 0 11	1 18 11 8	19.1						
16		6 33 11 11	6 50 11 8	5 27 14 10	5 45 14 6	1 36 11 4	1 55 11 0	20.1						
17		7 7 11 5	7 26 11 1	6 3 14 3	6 23 13 10	—	0 14 10 8	21.1						
18		7 48 10 8	8 13 10 3	6 44 13 5	7 8 13 0	0 36 10 3	1 0 9 11	22.1						
19		8 41 9 10	9 15 9 8	7 36 12 8	8 9 12 4	1 26 9 7	2 0 9 3	23.1						
20		9 55 9 6	10 35 9 6	8 47 12 2	9 29 12 1	2 39 9 1	3 22 9 0	24.1						
21		11 16 9 8	11 58 9 11	10 11 12 3	10 51 12 6	4 9 9 1	4 51 9 3	25.1						
22		—	0 36 10 4	11 29 12 11	—	5 31 9 7	6 5 10 1	26.1						
23		1 9 10 9	1 37 11 3	0 3 13 5	0 31 14 0	6 33 10 9	6 56 11 6	27.1						
24		2 2 11 10	2 26 12 5	0 56 14 8	1 21 15 5	7 18 12 3	7 37 13 0	28.1						
25		2 48 13 0	3 8 13 6	1 44 16 1	2 5 16 8	7 55 13 8	8 14 14 2	29.1						
26		3 28 14 0	3 50 14 4	2 26 17 2	2 48 17 7	8 35 14 7	8 57 14 9	30.7						
27		4 12 14 7	4 33 14 8	3 9 17 11	3 29 17 11	9 18 14 10	9 41 14 10	31.7						
28		4 56 14 7	5 19 14 5	3 52 17 10	4 14 17 8	10 4 14 8	10 27 14 4	32.7						
Half Mean Spring Range.		6ft. 8in.				8ft. 2in.				6ft. 7in.				

## Equation of Time at Noon.

M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
1	13 56	Sub.	9	14 31	Sub.	17	14 15	Sub.	25	13 16	Sub.
2	14 3		10	14 31		18	14 10		26	13 6	
3	14 9		11	14 31		19	14 4		27	12 55	
4	14 15		12	14 30		20	14 38		28	12 44	
5	14 20		13	14 29		21	13 51				
6	14 24		14	14 26		22	13 43				
7	14 27		15	14 23		23	13 35				
8	14 29		16	14 20		24	13 26				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 8 m.      LEITH add 13 m.      THURSO add 14 m.



## TIDE TABLES FOR THE

FEBRUARY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
			H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.				
W.	1	4 46	3 14	10 0		3 36	9 9	2 25	26 3		2 47	25 6	9 38	20 9	9 59								
Th.	2	5 39	3 58	9 7		4 21	9 4	3 9	24 8		3 32	23 9	10 20	19 1	10 42								
F.	3	6 33	4 45	9 2		5 12	8 11	3 56	22 10		4 26	22 0	11 5	17 6	11 30								
S.	4	7 27	5 42	8 8		6 18	8 5	4 59	21 1		5 39	20 7	—	—	0 3								
So.	5	8 20	6 57	8 3		7 41	8 3	6 23	20 4		7 11	20 4	0 39	15 9	1 24								
M.	6	9 12	8 22	8 3		9 0	8 5	7 51	20 7		8 29	21 1	2 11	15 9	2 52								
Tu.	7	10 3	9 34	8 7		10 5	8 8	9 0	21 7		9 28	22 3	3 29	16 8	4 1								
W.	8	10 51	10 33	8 10		10 56	9 0	9 53	22 10		10 15	23 5	4 32	17 11	4 58								
Th.	9	11 38	11 18	9 1		11 39	9 2	10 34	23 10		10 53	24 3	5 21	18 11	5 43								
F.	10	morn.	11 59	9 3		—	—	11 12	24 7		11 31	25 0	6 4	19 9	6 23								
S.	11	0 22	0 19	9 5		0 36	9 6	11 48	25 3		—	—	6 39	20 4	6 55								
So.	12	1 6	0 52	9 7		1 9	9 7	0 4	25 5		0 21	25 6	7 11	20 7	7 27								
M.	13	1 48	1 26	9 7		1 43	9 7	0 37	25 6		0 53	25 5	7 43	20 6	7 58								
Tu.	14	2 30	1 58	9 7		2 12	9 7	1 9	25 4		1 24	25 1	8 13	20 2	8 28								
W.	15	3 12	2 27	9 6		2 42	9 5	1 38	24 8		1 51	24 3	8 44	19 7	9 0								
Th.	16	3 55	2 58	9 3		3 13	9 2	2 7	23 10		2 24	23 4	9 16	18 9	9 31								
F.	17	4 40	3 29	9 1		3 46	8 11	2 40	22 10		2 56	22 3	9 47	17 9	10 4								
S.	18	5 27	4 5	8 9		4 26	8 8	3 15	21 8		3 37	21 0	10 23	16 8	10 44								
So.	19	6 17	4 49	8 6		5 19	8 4	4 2	20 4		4 34	19 9	11 9	15 6	11 39								
M.	20	7 9	5 52	8 2		6 30	8 1	5 11	19 4		5 51	19 3	—	—	0 13								
Tu.	21	8 3	7 11	8 0		7 54	8 1	6 40	19 6		7 24	20 0	0 52	14 11	1 39								
W.	22	8 59	8 36	8 4		9 13	8 7	8 5	20 9		8 41	21 8	2 25	15 10	3 6								
Th.	23	9 55	9 45	8 10		10 13	9 1	9 10	22 8		9 36	23 9	3 40	17 8	4 11								
F.	24	10 52	10 41	9 4		11 5	9 7	10 0	24 9		10 22	25 9	4 41	19 8	5 8								
S.	25	11 48	11 29	9 10		11 53	10 0	10 43	26 7		11 6	27 3	5 33	21 5	5 57								
So.	26	0 44	—	—		0 17	10 2	11 29	27 11		11 51	28 5	6 20	22 8	6 42								
M.	27	1 40	0 40	10 4		1 2	10 5	—	—		0 13	28 7	7 4	23 4	7 27								
Tu.	28	2 35	1 26	10 6		1 48	10 5	0 36	28 8		0 59	28 6	7 49	23 3	8 11								
Half Mean Spring Range.			4 ft. 10 in.						13 ft. 0 in.						10 ft. 6 in.								
Phases of the Moon.												Moon's Declination at Noon.											
												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter - 3 1 9 Morning.												1	9	N. 45	9	13	N. 33	17	14	S. 51	25	6	
Full - - - - - 10 4 27 Afternoon.												2	13	32	10	10	20	18	17	9	26	1	
Last Quarter - 18 9 38 Afternoon.												3	16	28	11	6	43	19	18	41	27	3	
New - - - - - 25 8 3 Afternoon.												4	18	26	12	2	52	20	19	18	28	8	
												5	19	22	13	1	S. 3	21	18	53			
In Apogee - - 13 9 0 Afternoon.												6	19	16	14	4	55	22	17	21			
In Perigee - - 26 0 0 Noon.												7	18	11	15	8	36	23	14	41			
												8	16	14	16	11	57	24	11	2			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

## FEBRUARY, 1865.

WESTON-SUPER-MARE.										HOLYHEAD.										KINGSTOWN.										C's Age at Noon.	
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.						
Time.		Height.			Time.		Height.			Time.		Height.			Time.		Height.			Time.		Height.			Time.		Height.				
H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	D.			
10	12	37	2	10	31	35	11	1	19	16	2	1	43	15	8	2	19	10	10	2	43	10	7	5	1				5	1	
10	49	34	6	11	9	33	2	2	8	15	2	2	33	14	8	3	7	10	4	3	32	10	0	6	1				6	1	
11	33	31	10	—	—	—	—	3	0	14	1	3	31	13	8	3	58	9	9	4	30	9	6	7	1				7	1	
0	2	30	6	0	38	29	7	4	7	13	2	4	48	12	11	5	5	9	2	5	42	9	0	8	1				8	1	
1	16	29	0	2	2	28	10	5	30	12	10	6	12	12	10	6	20	8	11	6	59	9	0	9	1				9	1	
2	44	29	0	3	25	29	6	6	51	12	11	7	25	13	2	7	38	9	1	8	13	9	3	10	1				10	1	
4	3	30	2	4	39	31	1	7	56	13	5	8	24	13	9	8	46	9	5	9	17	9	7	11	1				11	1	
5	12	32	1	5	39	33	0	8	49	14	1	9	10	14	5	9	46	9	10	10	10	10	0	12	1				12	1	
6	2	33	10	6	24	34	7	9	29	14	9	9	47	15	0	10	29	10	2	10	46	10	4	13	1				13	1	
6	45	35	2	7	5	35	7	10	6	15	3	10	24	15	5	11	3	10	6	11	20	10	8	14	1				14	1	
7	22	36	0	7	39	36	5	10	39	15	7	10	53	15	8	11	36	10	9	11	52	10	9	15	1				15	1	
7	55	36	6	8	10	36	7	11	8	15	8	11	22	15	8	—	—	0	9	10	9	16	10	9	16	1				16	1
8	26	36	6	8	41	36	5	11	38	15	7	11	54	15	6	0	25	10	9	0	42	10	8	17	1				17	1	
8	55	36	1	9	9	35	9	—	—	—	—	0	10	15	4	0	58	10	7	1	13	10	6	18	1				18	1	
9	22	35	4	9	37	34	9	0	26	15	2	0	42	14	11	1	29	10	4	1	45	10	3	19	1				19	1	
9	51	34	0	10	5	33	4	1	0	14	8	1	19	14	4	2	2	10	1	2	19	9	11	20	1				20	1	
10	19	32	5	10	34	31	6	1	37	14	0	1	56	13	8	2	37	9	9	2	56	9	6	21	1				21	1	
10	51	30	6	11	11	29	6	2	17	13	4	2	41	13	0	3	16	9	4	3	39	9	2	22	1				22	1	
11	39	28	8	—	—	—	—	3	7	12	7	3	41	12	4	4	6	8	11	4	39	8	9	23	1				23	1	
0	12	27	11	0	49	27	7	4	20	12	2	5	2	12	1	5	16	8	7	5	53	8	7	24	1				24	1	
1	31	27	8	2	15	28	2	5	44	12	3	6	25	12	7	6	33	8	8	7	12	8	10	25	1				25	1	
2	58	29	1	3	39	30	4	7	3	13	0	7	37	13	6	7	50	9	2	8	26	9	5	26	1				26	1	
4	17	31	9	4	50	33	4	8	6	14	0	8	32	14	8	8	57	9	9	9	26	10	1	27	1				27	1	
5	22	34	11	5	49	36	6	8	56	15	3	9	17	15	10	9	54	10	5	10	17	10	9	28	1				28	1	
6	14	37	10	6	39	39	0	9	38	16	5	9	59	16	10	10	36	11	1	10	56	11	4	29	1				29	1	
7	3	39	10	7	26	40	8	10	21	17	2	10	42	17	6	11	18	11	8	11	40	11	9	0	7				0	7	
7	48	41	1	8	10	41	11	11	1	17	7	11	22	17	7	—	—	0	1	11	10	1	10	1	7				1	7	
8	32	41	0	8	53	40	6	11	44	17	6	—	—	—	—	0	24	11	9	0	48	11	8	2	7				2	7	
Mean Spring Range. } 18ft. 7in.										8ft. 0in.										5ft. 6in.											

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
13 56	Sub.	9	14 31	Sub.	17	14 15	Sub.	25	13 16	Sub.
14 3		10	14 31		18	14 10		26	13 6	
14 9		11	14 31		19	14 4		27	12 55	
14 15		12	14 30		20	13 58		28	12 44	
14 20		13	14 29		21	13 51				
14 24		14	14 26		22	13 43				
14 27		15	14 23		23	13 35				
14 29		16	14 20		24	13 26				

Uses of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.



## FEBRUARY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.						
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
			H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	
W.	1		4 46	1 58	9 6	2 23	9 4		11 22	7 3		11 51	6 11		8 44	10 6		9 9			
Th.	2		5 39	2 50	9 2	3 16	8 11		—	—		0 22	6 7		9 36	9 9		10 7			
F.	3		6 33	3 43	8 9	4 13	8 6		0 57	6 3		1 35	6 0		10 40	9 0		11 16			
S.	4		7 27	4 46	8 4	5 23	8 2		2 17	5 10		3 0	5 10		11 55	8 7		—			
S.	5		8 20	6 1	8 1	6 43	8 0		3 39	5 11		4 17	6 0		0 34	8 6		1 17			
M.	6		9 12	7 23	8 1	7 59	8 2		4 50	6 2		5 19	6 3		1 56	8 6		2 32			
Tu.	7		10 3	8 30	8 3	8 58	8 6		5 44	6 5		6 9	6 7		3 2	9 0		3 29			
W.	8		10 51	9 23	8 8	9 45	8 10		6 33	6 9		6 56	6 11		3 52	9 7		4 12			
Th.	9		11 38	10 5	9 0	10 24	9 1		7 17	7 0		7 37	7 2		4 31	10 2		4 50			
F.	10		morn.	10 42	9 2	11 0	9 3		7 56	7 3		8 14	7 5		5 9	10 8		5 28			
S.	11		0 22	11 16	9 4	11 31	9 4		8 29	7 6		8 44	7 7		5 45	10 11		6 1			
S.	12		1 6	11 46	9 4	—	—		8 58	7 7		9 13	7 6		6 16	11 0		6 31			
M.	13		1 48	0 1	9 3	0 17	9 3		9 28	7 5		9 42	7 4		6 47	10 10		7 3			
Tu.	14		2 30	0 34	9 3	0 50	9 3		9 56	7 2		10 10	7 0		7 18	10 7		7 33			
W.	15		3 12	1 5	9 2	1 21	9 1		10 25	6 11		10 41	6 9		7 48	10 1		8 4			
Th.	16		3 55	1 39	9 0	1 58	8 10		10 57	6 7		11 16	6 5		8 20	9 7		8 38			
F.	17		4 40	2 18	8 9	2 38	8 7		11 39	6 2		—	—		8 57	9 1		9 20			
S.	18		5 27	2 59	8 5	3 23	8 3		0 5	5 11		0 35	5 8		9 46	8 6		10 15			
S.	19		6 17	3 49	8 2	4 21	8 1		1 8	5 5		1 48	5 4		10 50	8 1		11 29			
M.	20		7 9	4 57	8 0	5 35	7 11		2 32	5 4		3 12	5 5		—	—		0 8			
Tu.	21		8 3	6 14	7 11	6 56	7 11		3 52	5 8		4 28	5 11		0 48	8 1		1 30			
W.	22		8 59	7 36	8 1	8 11	8 3		5 0	6 2		5 28	6 5		2 9	8 7		2 44			
Th.	23		9 55	8 40	8 6	9 6	8 10		5 52	6 9		6 16	7 0		3 11	9 5		3 36			
F.	24		10 52	9 31	9 2	9 53	9 5		6 40	7 4		7 4	7 8		3 58	10 6		4 19			
S.	25		11 48	10 14	9 7	10 35	9 9		7 27	7 11		7 49	8 2		4 40	11 5		5 3			
S.	26		0 44	10 57	9 11	11 18	10 0		8 11	8 5		8 32	8 6		5 26	12 1		5 48			
M.	27		1 40	11 38	10 0	12 0	10 0		8 52	8 7		9 12	8 6		6 8	12 5		6 30			
Tu.	28		2 35	—	—	0 23	10 0		9 33	8 5		9 54	8 3		6 53	12 3		7 16			
Half Mean Spring } Range.			4 ft. 9 in.						3 ft. 10 in.						5 ft. 7 in.						
Phases of the Moon.										Moon's Declination at Noon.											
D. H. M.										M.D. ° ' "											
First Quarter	3	1	9	Morning.							1	9	N. 45	9	13	N. 33	17	14	S. 51	25	6
Full	10	4	27	Afternoon.							2	13	32	10	10	20	18	17	9	26	1
Last Quarter	18	9	38	Afternoon.							3	16	28	11	6	43	19	18	4	27	3
New	25	8	3	Afternoon.							4	18	26	12	2	52	20	19	18	28	8
In Apogee	13	9	0	Afternoon.							5	19	22	13	1	S. 3	21	18	53		
In Perigee	26	0	0	Noon.							6	19	16	14	4	55	22	17	21		
											7	18	11	15	8	36	23	14	41		
											8	16	14	16	11	57	24	11	2		

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 2 m. | LONDONDERRY add 4 m. | SLIGO BAY add 9 m.

## FEBRUARY, 1865.

GALWAY.					QUEENSTOWN.					WATERFORD.					C's Age at Noon.	
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.				
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.		D.
8 8 14 6		8 32 13 11			8 29 11 7				8 49 11 2				8 47 12 7		9 7 12 2	5.1
8 57 13 2		9 23 12 6			9 11 10 9				9 34 10 5				9 27 11 9		9 48 11 5	6.1
9 52 12 0		10 25 11 6			9 58 10 0				10 26 9 8				10 15 11 0		10 48 10 6	7.1
11 4 11 2		11 45 11 0			11 3 9 4				11 42 9 3				11 24 10 2		—	8.1
—		—			—				—				—		—	—
1 8 11 2		1 43 11 5			1 6 9 3				1 48 9 5				1 19 10 0		1 58 10 1	9.1
2 13 11 9		2 41 12 1			2 25 9 7				2 57 9 10				2 36 10 4		3 9 10 8	10.1
3 8 12 6		3 32 12 10			3 26 10 2				3 50 10 5				3 41 10 11		4 8 11 2	11.1
3 51 13 2		4 10 13 6			4 12 10 8				4 32 10 11				4 31 11 5		4 54 11 8	12.1
4 29 13 10		4 47 14 1			4 52 11 1				5 11 11 3				5 15 11 10		5 34 11 11	13.1
5 2 14 3		5 18 14 5			5 28 11 5				5 45 11 6				5 50 12 0		6 6 12 2	14.1
5 35 14 6		5 51 14 6			6 2 11 6				6 18 11 6				6 23 12 2		6 38 12 2	15.1
6 8 14 5		6 24 14 4			6 35 11 6				6 50 11 6				6 55 12 2		7 12 12 2	16.1
6 39 14 2		6 54 13 11			7 5 11 4				7 20 11 2				7 27 12 1		7 41 12 0	17.1
7 10 13 8		7 27 13 4			7 35 11 0				7 51 10 10				7 55 11 11		8 10 11 9	18.1
7 44 13 1		8 2 12 9			8 7 10 7				8 22 10 5				8 25 11 7		8 40 11 4	19.1
8 21 12 3		8 41 11 10			8 37 10 2				8 55 9 10				8 55 11 1		9 11 10 10	20.1
9 4 11 4		9 28 10 11			9 15 9 6				9 37 9 3				9 29 10 7		9 52 10 3	21.1
10 0 10 7		10 37 10 4			10 3 9 0				10 36 8 10				10 23 10 0		10 58 9 8	22.1
11 17 10 4		12 0 10 6			11 15 8 9				11 57 8 10				11 35 9 7		—	23.1
—		—			—				—				—		—	—
1 21 11 3		1 55 11 9			1 22 9 3				2 3 9 8				1 32 10 0		2 11 10 5	24.1
2 23 12 5		2 50 13 1			2 36 10 1				3 6 10 7				2 47 10 11		3 20 11 4	25.1
3 17 13 9		3 39 14 5			3 35 11 0				3 59 11 6				3 51 11 9		4 18 12 3	26.1
4 0 15 0		4 22 15 7			4 22 11 11				4 45 12 3				4 44 12 8		5 8 13 0	27.1
4 44 16 1		5 6 16 5			5 9 12 7				5 32 12 10				5 32 13 3		5 53 13 5	28.1
5 28 16 7		5 51 16 7			5 55 12 11				6 18 12 11				6 15 13 7		6 38 13 7	29.1
6 14 16 6		6 37 16 2			6 40 12 11				7 3 12 9				7 1 13 7		7 24 13 6	30.1
If Mean Spring } 7ft. 5in.					5ft. 10in.					6ft. 2in.						
Range.																

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
13 56	Sub.	9	14 31	Sub.	17	14 15	Sub.	25	13 16	Sub.
14 3		10	14 31		18	14 10		26	13 6	
14 9		11	14 31		19	14 4		27	12 55	
14 15		12	14 30		20	13 58		28	12 44	
14 20		13	14 29		21	13 51				
14 24		14	14 26		22	13 43				
14 27		15	14 23		23	13 35				
14 29		16	14 20		24	13 26				

is of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## MARCH, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
			H. M.	H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.		H. M. F. I.																							
W.	1	3 31	6 5	20 6		6 27	19 11		8 5	16 5		8 27	15 10		1 45	13 7		2 7	1																						
Th.	2	4 26	6 49	19 1		7 11	18 2		8 47	15 7		9 6	15 2		2 28	13 1		2 50	1																						
F.	3	5 22	7 36	17 2		8 1	16 2		9 27	14 8		9 50	14 2		3 13	12 4		3 36	1																						
S.	4	6 16	8 27	15 3		8 56	14 5		10 13	13 7		10 38	13 3		4 0	11 5		4 24	1																						
S.	5	7 9	9 31	13 10		10 11	13 5		11 7	12 6		11 38	12 6		4 52	10 6		5 25	1																						
M.	6	8 0	10 59	13 3		11 43	13 4		—	—		0 17	11 11		6 4	9 10		6 48	1																						
Tu.	7	8 49	—	—		0 26	13 8		0 59	12 4		1 41	12 0		7 31	9 10		8 13	1																						
W.	8	9 36	1 3	14 2		1 33	14 9		2 20	12 10		2 56	12 7		8 53	10 5		9 24	1																						
Th.	9	10 20	1 57	15 5		2 19	16 1		3 29	13 7		3 56	13 3		9 49	11 0		10 13	1																						
F.	10	11 4	2 39	16 8		2 56	17 3		4 21	14 3		4 44	13 11		10 34	11 7		10 52	1																						
S.	11	11 46	3 13	17 9		3 30	18 2		5 4	14 9		5 23	14 5		11 9	12 0		11 26	1																						
S.	12	morn.	3 47	18 5		4 2	18 6		5 41	15 2		5 58	14 10		11 43	12 4		11 58	1																						
M.	13	0 28	4 17	18 8		4 32	18 9		6 14	15 3		6 30	15 0		—	—		0 13	1																						
Tu.	14	1 10	4 48	18 8		5 2	18 8		6 46	15 3		7 0	15 0		0 29	12 5		0 45	1																						
W.	15	1 53	5 17	18 6		5 31	18 3		7 12	14 11		7 26	14 8		1 1	12 5		1 17	1																						
Th.	16	2 38	5 47	18 0		6 3	17 9		7 40	14 6		7 54	14 3		1 32	12 3		1 48	1																						
F.	17	3 24	6 19	17 4		6 36	16 10		8 10	14 0		8 26	13 10		2 3	12 0		2 20	1																						
S.	18	4 12	6 54	16 3		7 15	15 8		8 41	13 5		8 58	13 4		2 37	11 7		2 55	1																						
S.	19	5 1	7 38	15 0		8 1	14 6		9 18	12 10		9 39	12 10		3 15	11 1		3 36	1																						
M.	20	5 53	8 25	13 11		8 57	13 6		10 2	12 2		10 30	12 5		3 58	10 7		4 22	1																						
Tu.	21	6 47	9 35	13 6		10 20	13 5		11 3	11 9		11 41	12 3		4 54	10 0		5 30	1																						
W.	22	7 41	11 8	13 8		11 52	14 3		—	—		0 26	11 10		6 12	9 10		6 57	1																						
Th.	23	8 36	—	—		0 30	15 0		1 11	12 9		1 55	12 7		7 39	10 3		8 19	1																						
F.	24	9 31	1 3	15 10		1 34	16 11		2 35	13 8		3 10	13 7		7 54	11 3		9 27	1																						
S.	25	10 26	1 59	17 11		2 22	18 11		3 42	14 9		4 10	14 8		9 53	12 3		10 17	1																						
S.	26	11 21	2 43	19 9		3 5	20 7		4 37	15 9		5 2	15 8		10 39	13 1		11 1	1																						
M.	27	0 18	3 28	21 0		3 51	21 4		5 26	16 6		5 50	16 4		11 24	13 7		11 46	1																						
Tu.	28	1 14	4 14	21 6		4 37	21 5		6 14	16 11		6 37	16 8		—	—		0 10	1																						
W.	29	2 12	4 59	21 3		5 21	20 11		7 1	16 9		7 21	16 5		0 35	13 9		0 59	1																						
Th.	30	3 9	5 43	20 4		6 6	19 9		7 42	16 3		8 3	16 0		1 21	13 6		1 44	1																						
F.	31	4 6	6 27	19 0		6 49	18 1		8 24	15 6		8 44	15 3		2 6	13 0		2 28	1																						
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
D. H. M.																					M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'			
First Quarter - 4 0 19 Afternoon.																					1	12 N.	10	9	11 N.	6	17	16 S.	25	25	4	0	26	10	27	5	14	10			
Full - - - - 12 10 42 Morning.																					2	15	28	10	7	39	18	18	8	26	0	27	5	14	10	27	5	14	10		
Last Quarter - 20 0 36 Afternoon.																					3	17	47	11	3	54	19	19	1	26	0	27	5	14	10	27	5	14	10		
New - - - - 27 5 28 Morning.																					4	19	0	12	0	2	20	18	57	28	10	27	5	14	10	27	5	14	10		
																					5	19	10	13	38.	50	21	17	52	29	14	10	27	5	14	10	27	5	14	10	
In Apogee - - 13 2 0 Morning.																					6	18	19	14	7	33	22	15	43	30	16	10	27	5	14	10	27	5	14	10	
In Perigee - - 26 12 0 Midnight.																					7	16	36	15	10	58	23	12	36	31	18	10	27	5	14	10	27	5	14	10	
																					8	14	8	16	13	59	24	8	36			10	27	5	14	10	27	5	14	10	

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

BREST add 18 m.

DEVONPORT add 17 m.

PORTSMOUTH add 4 m.

## MARCH, 1865.

DOVER.				SHEERNESS.				LONDON.				C's Age at Noon.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	P.
H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	
1 21	20 4	1 45	20 0	2 53	17 4	3 14	17 2	4 23	20 7	4 45	20 5	3'7
8	19 7	2 31	19 0	3 35	16 10	3 57	16 5	5 6	20 2	5 27	19 9	4'7
54	18 3	3 17	17 6	4 19	16 0	4 42	15 5	5 48	19 3	6 12	18 9	5'7
41	16 9	4 5	16 0	5 6	14 11	5 32	14 5	6 35	18 2	7 1	17 6	)
31	15 3	5 1	14 7	6 0	13 11	6 32	13 5	7 28	17 0	8 0	16 6	7'7
36	14 2	6 16	14 0	7 10	13 0	7 53	12 10	8 37	16 0	9 21	15 9	8'7
57	14 1	7 39	14 5	8 40	12 10	9 22	13 10	4 15	6 10	47	15 7	9'7
18	14 11	8 48	15 5	10 3	13 4	10 39	13 8	11 30	15 9	—	—	10'7
12	15 11	9 36	16 4	11 7	14 0	11 31	14 4	0 6	16 0	0 34	16 4	11'7
57	16 10	10 16	17 2	11 52	14 8	—	—	1 0	16 9	1 23	17 2	12'7
35	17 6	10 54	17 10	0 11	14 11	0 29	15 2	1 42	17 6	2 0	17 10	13'7
12	18 1	11 30	18 2	0 46	15 5	1 3	15 7	2 18	18 1	2 34	18 5	0
46	18 4	—	—	1 19	15 9	1 34	15 10	2 50	18 7	3 5	18 9	15'7
2	18 5	0 19	18 4	1 49	15 11	2 4	15 11	3 19	18 11	3 33	19 0	16'7
36	18 4	0 52	18 3	2 19	15 11	2 34	15 10	3 49	19 0	4 3	18 11	17'7
9	18 2	1 26	17 11	2 48	15 9	3 2	15 7	4 19	18 10	4 35	18 9	18'7
43	17 9	2 0	17 6	3 17	15 5	3 32	15 3	4 50	18 7	5 5	18 4	19'7
18	17 2	2 37	16 9	3 49	15 0	4 7	14 9	5 20	18 2	5 37	17 10	20'7
56	16 3	3 17	15 10	4 25	14 5	4 45	14 0	5 56	17 6	6 16	17 2	21'7
39	15 4	4 3	14 11	5 8	13 8	5 32	13 5	6 39	16 9	7 2	16 5	22'7
32	14 6	5 5	14 2	6 0	13 1	6 36	12 10	7 30	16 2	8 3	15 11	23'7
43	14 2	6 24	14 4	7 16	12 9	8 2	12 11	8 45	15 9	9 29	15 8	24'7
5	14 10	7 45	15 6	8 49	13 2	9 30	13 7	10 13	15 10	10 56	16 2	25'7
19	16 3	8 50	17 10	7 14	1	10 39	14 7	11 34	16 6	—	—	26'7
16	17 10	9 41	18 7	11 8	15 2	11 32	15 8	0 6	17 1	0 35	17 8	27'7
5	19 3	10 29	19 10	11 54	16 2	—	—	1 0	18 3	1 25	18 10	28'7
53	20 2	11 18	20 6	0 16	16 7	0 38	17 0	1 47	19 5	2 9	19 11	29'7
43	20 7	—	—	1 1	17 3	1 23	17 5	2 31	20 3	2 54	20 6	1'3
9	20 7	0 33	20 6	1 46	17 6	2 9	17 5	3 16	20 8	3 37	20 8	2'3
56	20 3	1 21	19 10	2 31	17 3	2 52	17 1	3 59	20 7	4 22	20 4	3'3
45	19 4	2 8	18 10	3 13	16 9	3 35	16 4	4 45	20 0	5 7	19 7	4'3
Mean Spring Tide.		9ft. 4in.		8ft. 0in.		9ft. 7in.						

## Equation of Time at Noon.

L. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
32	Sub.	9	10 41	Sub.	17	8 27	Sub.	25	6 2	Sub.
20		10	10 26		18	8 10		26	5 44	
7		11	10 10		19	7 52		27	5 26	
54		12	9 53		20	7 34		28	5 7	
41		13	9 37		21	7 16		29	4 49	
26		14	9 20		22	6 57		30	4 30	
13		15	9 2		23	6 39		31	4 12	
57		16	8 45		24	6 21				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 5 m. | LONDON 0 m.

## TIDE TABLES FOR THE

MARCH, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.															
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.											
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.														
W.	1	3 33 1	2	9	12	3	2	31	12	1	8	49	22	7	9	11	22	1	5	39	15	6	6	1	15	3								
Th.	2	4 26	2	53	11	11	3	10	11	8	9	33	21	5	9	55	20	9	6	24	14	8	6	47	14	3								
F.	3	5 22	3	37	11	5	3	59	11	1	10	17	20	0	10	42	19	2	7	12	13	7	7	38	13	0								
S.	4	6 16	4	22	10	9	4	46	10	5	11	10	18	4	11	42	17	7	8	4	12	5	8	32	11	11								
S.	5	7 9	5	13	10	2	5	42	9	11	—	—	—	0	17	16	11	9	4	11	5	9	41	11	0	0								
M.	6	8 0	6	17	9	8	7	0	9	7	0	55	16	4	1	33	16	0	10	23	10	9	11	6	10	3								
Tu.	7	8 49	7	48	9	7	8	30	9	8	2	14	15	11	2	53	16	1	11	47	10	9	—	—	—	—								
W.	8	9 36	9	10	9	10	9	46	10	0	3	32	16	7	4	8	17	2	0	24	11	1	0	58	11	3								
Th.	9	10 20	10	16	10	3	10	41	10	6	4	36	17	8	5	0	18	3	1	26	11	10	1	50	12	3								
F.	10	11 4	11	3	10	9	11	23	10	11	5	21	18	8	5	40	19	2	2	14	12	7	2	35	12	11								
S.	11	11 46	11	41	11	1	11	58	11	3	5	57	19	6	6	15	19	9	2	53	13	2	3	10	13	5								
S.	12	morn.	—	—	—	0	16	11	4	6	6	33	20	1	6	50	20	3	3	26	13	8	3	42	13	10								
M.	13	0 28	0	33	11	5	0	47	11	5	7	5	20	4	7	20	20	6	3	57	14	0	4	12	14	2								
Tu.	14	1 10	1	1	11	6	1	17	11	5	7	36	20	7	7	52	20	7	4	27	14	3	4	42	14	3								
W.	15	1 53	1	33	11	5	1	48	11	4	8	7	20	6	8	21	20	5	4	57	14	1	5	11	14	0								
Th.	16	2 38	2	3	11	3	2	18	11	2	8	36	20	3	8	52	19	11	5	26	13	10	5	42	13	7								
F.	17	3 24	2	34	11	0	2	50	10	10	9	8	19	7	9	25	19	3	5	59	13	3	6	16	13	0								
S.	18	4 12	3	7	10	9	3	24	10	7	9	43	18	9	10	1	18	4	6	35	12	9	6	55	12	5								
S.	19	5 1	3	42	10	4	4	1	10	2	10	21	17	10	10	44	17	4	7	17	12	1	7	40	11	8								
M.	20	5 53	4	23	10	0	4	46	9	10	11	12	16	10	11	42	16	5	8	5	11	4	8	33	11	1								
Tu.	21	6 47	5	11	9	8	5	44	9	6	—	—	—	0	21	16	1	9	7	10	10	9	47	10	9	0								
W.	22	7 41	6	22	9	6	7	9	9	7	1	1	15	11	1	40	16	0	10	31	10	9	11	15	11	4								
Th.	23	8 36	7	57	9	9	8	38	10	0	2	22	16	4	3	0	17	0	11	53	11	4	—	—	—	—								
F.	24	9 31	9	14	10	4	9	46	10	8	3	35	17	10	4	8	18	8	0	27	11	11	0	58	12	6								
S.	25	10 26	10	18	11	1	10	43	11	5	4	38	19	6	5	1	20	4	1	28	13	2	1	54	13	9								
S.	26	11 21	11	7	11	9	11	29	12	1	5	24	21	1	5	45	21	8	2	19	14	3	2	41	14	9								
M.	27	0 18	11	52	12	3	—	—	—	6	6	7	22	2	6	31	22	7	3	3	15	2	3	24	15	6								
Tu.	28	1 14	0	15	12	5	0	36	12	6	6	54	22	10	7	17	23	0	3	46	15	9	4	9	15	11								
W.	29	2 12	0	58	12	6	1	22	12	5	7	41	22	11	8	4	22	9	4	32	15	11	4	54	15	9								
Th.	30	3 9	1	45	12	3	2	7	12	1	8	25	22	6	8	48	22	0	5	15	15	6	5	38	15	1								
F.	31	4 6	2	30	11	10	2	53	11	7	9	11	21	4	9	33	20	8	6	2	14	7	6	25	14	1								
Half Mean Spring Range			5 ft. 9 in.								10 ft. 5 in.								7 ft. 2 in.															
Phases of the Moon.											Moon's Declination at Noon.																							
D. H. M.											M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'						
First Quarter 4 0 19 Afternoon.											1	12	N. 10	9	11	N. 6	17	16	S. 25	25	48	0	25	48	0	25	48	0	25	48	0	25	48	0
Full - - - - 12 10 42 Morning.											2	15	28	10	7	39	18	18	8	26	0	N. 57	26	0	N. 57	26	0	N. 57	26	0	N. 57	26	0	
Last Quarter - 20 0 36 Afternoon.											3	17	47	11	3	54	19	19	1	27	5	51	27	5	51	27	5	51	27	5	51	27	5	
New - - - - 27 5 28 Morning.											4	19	0	12	0	2	20	18	57	28	10	23	28	10	23	28	10	23	28	10	23	28	10	
											5	19	10	13	38	50	21	17	52	29	14	8	29	14	8	29	14	8	29	14	8			
											6	18	19	14	7	33	22	15	43	30	16	53	30	16	53	30	16	53	30	16	53	30	16	
In Apogee - - 13 2 0 Morning.											7	16	36	15	10	58	23	12	36	31	18	34	31	18	34	31	18	34	31	18	34	31	18	
In Perigee - - 26 12 0 Midnight.											8	14	8	16	13	59	24	8	36	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 HARWICH subtract 5 m.      HULL add 1 m.      SUNDERLAND add 5 m.

## MARCH, 1865.

NORTH SHIELDS.										LEITH.										THURSO.										C's Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
me. M.	Height. F. I.	Time. H. M.	Height. F. I.		Time. H. M.	Height. F. I.			Time. H. M.	Height. F. I.			Time. H. M.	Height. F. I.			Time. H. M.	Height. F. I.			Time. H. M.	Height. F. I.			D.					
42	14 2	6 5	13 11		4 37	17 4			5 0	17 0	10 50	14 0		11 13	13 6			3 7								3 7				
28	13 6	6 51	13 1		5 22	16 7			5 45	16 11	11 37	12 11		—	—			4 7								4 7				
14	12 6	7 40	11 11		6 10	15 6			6 37	14 10	0 2	12 3		0 28	11 8			5 7								5 7				
8	11 4	8 39	10 8		7 4	14 2			7 34	13 7	0 55	11 0		1 24	10 6			—								—				
13	10 3	9 53	9 11		8 7	13 0			8 45	12 7	1 58	9 11		2 37	9 6			7 7								7 7				
35	9 9	11 18	9 9		9 28	12 3			10 13	12 3	3 22	9 3		4 11	9 1			8 7								8 7				
0	9 10	—	—		10 53	12 4			11 31	12 7	4 53	9 1		5 33	9 3			9 7								9 7				
38	10 0	1 11	10 4		—	—			0 5	12 11	6 7	9 7		6 34	10 0			10 7								10 7				
38	10 8	1 59	11 0		0 32	13 4			0 53	13 9	6 54	10 7		7 13	11 1			11 7								11 7				
20	11 4	2 39	11 9		1 14	14 3			1 34	14 8	7 30	11 6		7 44	11 11			12 7								12 7				
56	12 1	3 11	12 4		1 52	15 0			2 8	15 4	7 58	12 4		8 13	12 8			13 7								13 7				
27	12 7	3 43	12 9		2 25	15 8			2 41	15 10	8 29	12 10		8 44	12 11			—								—				
58	12 11	4 12	13 0		2 56	16 0			3 9	16 1	8 58	13 0		9 12	13 0			15 7								15 7				
27	13 0	4 43	12 11		3 23	16 1			3 38	16 0	9 27	13 0		9 43	12 11			16 7								16 7				
59	12 10	5 14	12 8		3 54	15 11			4 9	15 9	9 59	12 9		10 15	12 6			17 7								17 7				
30	12 6	5 46	12 4		4 25	15 6			4 41	15 4	10 31	12 3		10 48	12 0			18 7								18 7				
5	3 12	6 20	11 11		4 57	15 1			5 14	14 10	11 5	11 8		11 25	11 4			19 7								19 7				
5	38 11	8 6	57 11		4 5	33 14			5 53	14 2	11 45	11 0		—	—			20 7								20 7				
7	18 11	0 7	43 10		7 6	15 13			6 39	13 4	0 7	10 7		0 31	10 2			21 7								21 7				
8	10 10	2 8	39 9		7 4	13 0			7 34	12 8	0 56	9 10		1 25	9 6			—								—				
9	17 9	8 10	0 9		7 8	11 12			8 52	12 3	2 2	9 4		2 44	9 23			23 7								23 7				
0	43 9	9 11	26 10		9 37	12 4			10 21	12 7	3 32	9 3		4 20	9 5			24 7								24 7				
—	—	0 7	10 5		11 0	13 0			11 34	13 6	5 1	9 8		5 36	10 2			25 7								25 7				
0	41 10	11 1	10 11		4	—			0 5	14 1	6 6	10 9		6 33	11 6			26 7								26 7				
1	38 12	0 2	1 12		6 0	32 14			0 55	15 5	6 54	12 3		7 14	13 0			27 7								27 7				
2	23 13	1 2	42 13		8 1	18 16			1 39	16 9	7 31	13 8		7 50	14 3			28 7								28 7				
3	3 14	1 3	25 14		5 2	1 17			2 24	17 8	8 11	14 8		8 33	14 11			—								—				
3	47 14	8 4	10 14		9 2	45 17			3 6	18 0	8 55	14 11		9 17	14 10			1 3								1 3				
4	33 14	8 4	56 14		6 3	28 17			3 50	17 8	9 40	14 8		10 2	14 4			2 3								2 3				
5	18 14	2 5	42 13		9 4	12 17			4 36	17 0	10 26	13 11		10 51	13 5			3 3								3 3				
6	6 13	5 6	28 13		0 5	0 16			5 23	16 0	11 15	12 10		11 39	12 2			4 3								4 3				
Mean Spring range.					6ft. 8in.					8ft. 2in.					6ft. 7in.															

## Equation of Time at Noon.

M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
12 32	Sub.	9	10 41	Sub.	17	8 27	Sub.	25	6 2	Sub.
12 20		10	10 26		18	8 10		26	5 44	
12 7		11	10 10		19	7 52		27	5 26	
11 54		12	9 53		20	7 34		28	5 7	
11 41		13	9 37		21	7 16		29	4 49	
11 26		14	9 20		22	6 57		30	4 30	
11 12		15	9 2		23	6 39		31	4 12	
10 57		16	8 45		24	6 21				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.      LEITH add 13 m.      THURSO add 14 m.

## TIDE TABLES FOR THE

MARCH, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.																		
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.																
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.															
			H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.															
W.	1	3a31	2 10 10 4	2 32 10 3	1 21 28 2	1 43 27 7	8 33 22 5	8 55 2																					
Th.	2	4 26	2 53 10 1	3 15 9 10	2 3 26 9	2 25 25 10	9 17 21 0	9 38 2																					
F.	3	5 22	3 36 9 7	3 59 9 5	2 47 24 11	3 10 23 10	10 0 19 3	10 22 1																					
S.	4	6 16	4 24 9 2	4 49 8 11	3 35 22 10	4 0 21 10	10 45 17 5	11 8 1																					
S.	5	7 9	5 17 8 7	5 51 8 4	4 32 20 10	5 9 20 1	11 37 15 8	—																					
M.	6	8 0	6 30 8 2	7 14 8 0	5 53 19 8	6 43 19 7	0 13 15 2	0 55 1																					
Tu.	7	8 49	7 56 8 1	8 38 8 2	7 26 19 9	8 6 20 3	1 42 15 0	2 28 1																					
W.	8	9 36	9 15 8 4	9 46 8 6	8 43 20 10	9 10 21 6	3 8 16 0	3 41 1																					
Th.	9	10 20	10 10 8 8	10 34 8 10	9 33 22 3	9 54 22 11	4 8 17 4	4 34 1																					
F.	10	11 4	10 54 9 0	11 13 9 1	10 13 23 6	10 30 24 0	4 56 18 7	5 16 1																					
S.	11	11 46	11 32 9 3	11 51 9 4	10 47 24 5	11 4 24 9	5 36 19 6	5 56 1																					
S.	12	morn.	—	0 9 9 5	11 21 25 1	11 37 25 3	6 13 20 2	6 29 2																					
M.	13	0 28	0 25 9 6	0 40 9 7	11 52 25 6	—	6 43 20 7	6 59 2																					
Tu.	14	1 10	0 56 9 7	1 12 9 7	0 8 25 7	0 23 25 7	7 14 20 8	7 29 2																					
W.	15	1 53	1 28 9 7	1 43 9 7	0 39 25 6	0 54 25 5	7 44 20 5	7 58 2																					
Th.	16	2 38	1 57 9 7	2 13 9 6	1 8 25 2	1 24 24 9	8 14 19 11	8 30 1																					
F.	17	3 24	2 29 9 5	2 45 9 4	1 39 24 4	1 55 23 11	8 47 19 3	9 5 1																					
S.	18	4 12	3 2 9 2	3 19 9 0	2 12 23 4	2 30 22 9	9 21 18 3	9 39 1																					
S.	19	5 1	3 38 8 11	4 0 8 9	2 48 22 2	3 10 21 6	9 59 17 2	10 19 1																					
M.	20	5 53	4 22 8 7	4 47 8 5	3 33 20 10	4 0 20 3	10 41 16 0	11 8 1																					
Tu.	21	6 47	5 19 8 4	5 56 8 2	4 35 19 9	5 16 19 7	11 40 15 2	—																					
W.	22	7 41	6 38 8 1	7 23 8 2	6 2 19 8	6 52 20 1	0 20 15 2	1 5 1																					
Th.	23	8 36	8 4 8 4	8 42 8 7	7 34 20 10	8 11 21 9	1 52 15 11	2 34 1																					
F.	24	9 31	9 16 8 11	9 48 9 2	8 42 22 9	9 10 23 11	3 10 17 8	3 44 1																					
S.	25	10 26	10 14 9 5	10 38 9 8	9 34 24 11	9 57 26 0	4 13 19 9	4 40 2																					
S.	26	11 21	11 2 9 11	11 26 10 1	10 18 26 10	10 40 27 6	5 4 21 7	5 30 2																					
M.	27	oa18	11 50 10 3	—	11 3 28 0	11 26 28 6	5 55 22 9	6 18 2																					
Tu.	28	1 14	0 14 10 4	0 38 10 5	11 49 28 8	—	6 40 23 5	7 42 2																					
W.	29	2 12	1 2 10 6	1 25 10 5	0 13 28 8	0 36 28 6	7 26 23 2	7 47 2																					
Th.	30	3 9	1 47 10 4	2 9 10 3	0 58 28 1	1 20 27 5	8 10 22 3	8 33 2																					
F.	31	4 6	2 32 10 1	2 53 9 10	1 42 26 7	2 3 25 9	8 55 20 11	9 17 2																					
Half Mean Spring Range.			4ft. 10in.				13ft. 0in.				10ft. 6in.																		
Phases of the Moon.															Moon's Declination at Noon.														
D. H. M.															M.D. ° ' M.D. ° ' M.D. ° ' M.D. °														
First Quarter - 4 0 19 Afternoon.															1 12 N. 10 9 11 N. 6 17 16 S. 25 25 4														
Full - - - - - 12 10 42 Morning.															2 15 28 10 7 39 18 18 8 26 01														
Last Quarter - 20 0 36 Afternoon.															3 17 47 11 3 54 19 19 1 27 5														
New - - - - - 27 5 28 Morning.															4 19 0 12 0 2 20 18 57 28 10														
															5 19 10 13 3 S. 50 21 17 52 29 14														
In Apogee - - 13 2 0 Morning.															6 18 19 14 7 33 22 15 43 30 16														
In Perigee - - 26 12 0 Midnight.															7 16 36 15 10 58 23 12 36 31 18														
															8 14 8 16 13 59 24 8 36														

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required

GREENOCK add 19 m.

LIVERPOOL add 12 m.

PEMBROKE add 20 m.

## MARCH, 1865.

WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age at Noon.	
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.			
Time. I. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		
9 14 39	10	9 34 38	11	0 7 17	3	0 31 16	11	1 11 11	6	1 34 11	4	3.7	
9 53 37	8	10 13 36	3	0 55 16	6	1 19 15	11	1 57 11	1	2 20 10	9	4.7	
0 32 34	9	10 51 33	3	1 44 15	4	2 10 14	8	2 44 10	5	3 9 10	1	5.7	
1 12 31	8	11 37 30	2	2 36 14	1	3 5 13	6	3 35 9	9	4 4 9	5	D	
—	—	0 11 29	0	3 39 13	0	4 18 12	7	4 37 9	1	5 15 8	10	7.7	
0 49 28	1	1 34 27	10	5 1 12	4	5 46 12	4	5 53 8	8	6 34 8	9	8.7	
2 17 27	11	3 0 28	4	6 27 12	6	7 5 12	8	7 14 8	10	7 52 9	0	9.7	
3 41 29	2	4 17 30	1	7 39 13	0	8 6 13	4	8 28 9	2	8 58 9	5	10.1	
4 46 31	1	5 13 32	3	8 29 13	9	8 50 14	2	9 23 9	7	9 47 9	10	11.7	
5 37 33	2	5 57 34	0	9 8 14	6	9 25 14	9	10 8 10	0	10 25 10	3	12.7	
6 17 34	9	6 37 35	4	9 41 15	1	9 58 15	4	10 40 10	5	10 55 10	7	13.7	
6 55 35	9	7 11 36	1	10 14 15	6	10 29 15	7	11 11 10	8	11 26 10	9	O	
7 27 36	6	7 42 36	9	10 42 15	9	10 55 15	9	11 40 10	10	11 55 10	10	15.7	
7 58 36	8	8 13 36	7	11 9 15	9	11 24 15	8	—	—	0 11 10	9	16.7	
8 27 36	5	8 41 36	2	11 39 15	7	11 55 15	5	0 27 10	9	0 43 10	8	17.7	
8 56 35	9	9 10 35	4	—	—	0 12 15	2	0 59 10	7	1 15 10	5	18.7	
9 25 34	10	9 40 34	0	0 29 15	0	0 48 14	9	1 32 10	3	1 49 10	1	19.7	
9 55 33	2	10 11 32	3	1 7 14	4	1 27 14	0	2 7 9	10	2 27 9	8	20.7	
0 28 31	4	10 46 30	4	1 48 13	8	2 12 13	3	2 48 9	6	3 11 9	4	21.7	
1 7 29	5	11 40 28	7	2 37 12	11	3 5 12	7	3 35 9	1	4 4 8	11	C	
—	—	0 16 28	2	3 43 12	4	4 24 12	3	4 41 8	9	5 19 8	8	23.7	
0 57 28	1	1 43 28	6	5 10 12	4	5 55 12	8	6 1 8	9	6 42 8	11	24.7	
2 26 29	4	3 6 30	6	6 34 13	1	7 8 13	7	7 21 9	2	7 55 9	6	25.7	
3 44 31	10	4 21 33	6	7 38 14	1	8 7 14	5	8 28 9	10	9 0 10	2	26.7	
4 52 35	1	5 21 36	9	8 30 15	5	8 52 16	0	9 27 10	6	9 52 10	10	27.7	
5 46 38	1	6 11 39	3	9 12 16	6	9 34 17	0	10 12 11	2	10 31 11	5	28.7	
6 36 40	1	7 0 40	8	9 56 17	4	10 18 17	6	10 53 11	8	11 15 11	10	●	
7 24 41	1	7 47 41	1	10 39 17	8	11 0 17	7	11 37 11	10	12 0 11	10	1.3	
8 10 40	10	8 31 40	4	11 21 17	5	11 43 17	2	—	—	0 24 11	8	2.3	
8 52 39	7	9 13 38	7	—	—	0 7 16	10	0 47 11	6	1 10 11	3	3.3	
9 33 37	6	9 52 36	1	0 32 16	4	0 57 15	10	1 35 11	0	1 58 10	8	4.3	
Mean Spring Tide.				18ft. 7in.				8ft. 0in.				5ft. 6in.	

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
2 32	Sub.	9	10 41	Sub.	17	8 27	Sub.	25	6 2	Sub.
2 20		10	10 26		18	8 10		26	5 44	
2 7		11	10 10		19	7 52		27	5 26	
1 54		12	9 53		20	7 34		28	5 7	
1 41		13	9 37		21	7 16		29	4 49	
1 26		14	9 20		22	6 57		30	4 30	
1 12		15	9 2		23	6 39		31	4 12	
0 57		16	8 45		24	6 21				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 -SUPER-MARE add 12 m. | HOLYHEAD add 12 m. | KINGSTOWN subtract 1 m. for Dublin Time.



## TIDE TABLES FOR THE

MARCH, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTER.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.
W.	1	3 31	0 47	9 11	1 10	9 10	10 15	8 0	10 36	7 9	7 38	11 8	8 0	
Th.	2	4 26	1 33	9 8	1 58	9 5	10 59	7 5	11 23	7 1	8 22	10 9	8 45	
F.	3	5 22	2 25	9 3	2 52	9 0	11 53	6 8	—	—	9 11	9 9	9 41	
S.	4	6 16	3 19	8 9	3 47	8 6	0 28	6 3	1 5	5 11	10 13	8 11	10 48	
♄.	5	7 9	4 19	8 3	4 56	8 1	1 45	5 9	2 30	5 7	11 27	8 4	—	
M.	6	8 0	5 35	8 0	6 16	7 11	3 12	5 7	3 53	5 9	0 8	8 2	0 50	
Tu.	7	8 49	6 58	7 11	7 38	7 11	4 30	5 10	5 2	6 0	1 32	8 2	2 11	
W.	8	9 36	8 13	8 1	8 40	8 3	5 30	6 2	5 54	6 4	2 46	8 8	3 12	
Th.	9	10 20	9 2	8 6	9 24	8 9	6 13	6 6	6 34	6 9	3 33	9 3	3 53	
F.	10	11 4	9 43	8 11	10 1	9 0	6 54	6 11	7 12	7 1	4 10	9 11	4 27	
S.	11	11 46	10 18	9 2	10 34	9 3	7 30	7 3	7 48	7 4	4 44	10 6	5 1	
♄.	12	morn.	10 50	9 4	11 5	9 4	8 4	7 5	8 19	7 6	5 18	10 10	5 34	
M.	13	0 28	11 19	9 4	11 33	9 4	8 32	7 7	8 46	7 7	5 49	11 1	6 3	
Tu.	14	1 10	11 48	9 4	—	—	9 0	7 7	9 14	7 6	6 18	11 0	6 33	
W.	15	1 53	0 3	9 4	0 18	9 3	9 28	7 4	9 42	7 3	6 48	10 10	7 3	
Th.	16	2 38	0 34	9 3	0 51	9 2	9 57	7 1	10 12	6 11	7 19	10 5	7 35	
F.	17	3 24	1 8	9 1	1 26	9 0	10 28	6 9	10 46	6 7	7 52	9 11	8 9	
S.	18	4 12	1 46	8 11	2 7	8 9	11 6	6 4	11 31	6 1	8 28	9 4	8 49	
♄.	19	5 1	2 30	8 7	2 54	8 5	12 0	5 10	—	—	9 15	8 9	9 43	
M.	20	5 53	3 19	8 3	3 47	8 2	0 32	5 7	1 7	5 5	10 13	8 3	10 52	
Tu.	21	6 47	4 22	8 1	5 0	8 0	1 51	5 5	2 36	5 5	11 32	8 1	—	
W.	22	7 41	5 42	8 0	6 25	8 0	3 20	5 7	4 0	5 11	0 15	8 2	0 59	
Th.	23	8 36	7 6	8 1	7 42	8 3	4 35	6 2	5 3	6 6	1 39	8 7	2 14	
F.	24	9 31	8 13	8 6	8 41	8 10	5 28	6 10	5 52	7 1	2 45	9 6	3 12	
S.	25	10 26	9 4	9 2	9 27	9 5	6 15	7 5	6 38	7 9	3 34	10 6	3 54	
♄.	26	11 21	9 49	9 8	10 10	9 10	7 0	8 0	7 23	8 3	4 14	11 6	4 36	
M.	27	0 18	10 32	10 0	10 54	10 0	7 46	8 5	8 8	8 7	4 59	12 2	5 23	
Tu.	28	1 14	11 16	10 1	11 38	10 0	8 29	8 8	8 50	8 7	5 46	12 5	6 8	
W.	29	2 12	12 0	9 11	—	—	9 11	8 5	9 32	8 3	6 30	12 3	6 52	
Th.	30	3 9	0 22	9 10	0 46	9 9	9 53	8 0	10 14	7 8	7 15	11 7	7 38	
F.	31	4 6	1 10	9 7	1 35	9 5	10 36	7 5	10 59	7 1	8 0	10 8	8 22	
Half Mean Spring Range.			4 ft. 9 in.				3 ft. 10 in.				5 ft. 7 in.			
Phases of the Moon.							Moon's Declination at Noon.							
D. H. M.							M. D.	°	'	M. D.	°	'	M. D.	°
First Quarter 4 0 19 Afternoon.							1	12 N.	10	9	11 N.	6	17	16 S. 25
Full - - - - 12 10 42 Morning.							2	15	28	10	7	39	18	18 8
Last Quarter - 20 0 36 Afternoon.							3	17	47	11	3	54	19	19 1
New - - - - 27 5 28 Morning.							4	19	0	12	0	2	20	18 57
							5	19	10	13	3 S.	50	21	17 52
In Apogee - - 13 2 0 Morning.							6	18	19	14	7	33	22	15 43
In Perigee - - 26 12 0 Midnight.							7	16	36	15	10	58	23	12 36
							8	14	8	16	13	59	24	8 36

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 3 m. | LONDONDERRY add 4 m. | SLIGO BAY add 9 m.

## MARCH, 1865.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.			
59 15 10	7 22 15	4 7 25	12 6	7 46	12 2	7 46	13 3	8 7 13	0 3 7									
45 14 9	8 9 14	1 8 8	11 9	8 29	11 4	8 27	12 8	8 47 12	3 4 7									
34 13 4	9 0 12	7 8 50	10 10	9 13	10 5	9 8	11 10	9 28 11	5 5 7									
27 11 10	9 58 11	3 9 37	9 11	10 2 9	6	9 51	10 11	10 21 10	6									
35 10 10	11 16 10	7 10 35	9 2	11 15 8	11	10 57	10 0	11 35 9	9 7 7									
—	0 2 10	6 12 0	8 10	—	—	—	—	0 15 9	7 8 7									
44 10 7	1 23 10	10 0 42	8 11	1 24 9	1	0 55 9	8	1 34 9	9 9 7									
57 11 3	2 23 11	8 2 5 9	3	2 37 9	7	2 13 10	0	2 47 10	4 10 7									
47 12 1	3 9 12	6 3 2 9	10	3 27 10	2	3 16 10	8	3 42 11	0 11 7									
30 12 11	3 47 13	3 3 48	10 6	4 7 10	9	4 6 11	3	4 26 11	6 12 7									
4 13 7	4 22 13	11 4 26	11 0	4 44 11	2	4 47 11	8	5 6 11	10 13 7									
38 14 2	4 52 14	4 5 1 11	4	5 17 11	5	5 24 12	0	5 39 12	1 0									
6 14 6	5 22 14	7 5 33 11	6	5 49 11	7	5 53 12	2	6 9 12	3 15 7									
38 14 7	5 54 14	6 6 5 11	7	6 20 11	6	6 25 12	3	6 41 12	3 16 7									
9 14 4	6 24 14	2 6 35 11	6	6 50 11	5	6 56 12	2	7 11 12	1 17 7									
40 14 0	6 57 13	9 7 6 11	3	7 22 11	1	7 27 12	0	7 42 11	11 18 7									
14 13 5	7 32 13	1 7 38 10	10	7 55 10	7	7 58 11	9	8 14 11	7 19 7									
52 12 8	8 13 12	2 8 12 10	4	8 30 10	1	8 30 11	4	8 47 11	12 20 7									
36 11 8	9 0 11	3 8 50 9	9	9 11 9	6	9 5 10	9	9 25 10	6 21 7									
27 10 10	10 1 10	7 9 33 9	3	10 3 9	0	9 49 10	3	10 23 10	0									
40 10 6	11 25 10	7 10 40 8	11	11 23 8	11	11 1 9	9	11 42 9	8 23 7									
—	0 11 10	—	—	0 9 9	1	—	—	0 23 9	10 24 7									
51 11 3	1 26 11	10 0 50 9	4	1 30 9	8	1 2 10	1	1 39 10	5 25 7									
56 12 6	2 24 13	3 2 6 10	1	2 40 10	7	2 16 10	11	2 52 11	5 26 7									
49 13 11	3 13 14	7 3 7 11	1	3 32 11	7	3 22 11	10	3 50 12	4 27 7									
34 15 2	3 56 15	8 3 56 12	0	4 19 12	4	4 15 12	9	4 41 13	1 28 7									
19 16 1	4 41 16	5 4 43 12	8	5 6 12	10	5 6 13	4	5 29 13	6									
3 16 7	5 27 16	7 5 30 12	11	5 54 12	11	5 51 13	7	6 15 13	7 1 3									
51 16 5	6 14 16	2 6 18 12	10	6 40 12	8	6 38 13	6	7 0 13	5 2 3									
37 15 9	7 0 15	3 7 2 12	5	7 24 12	1	7 23 13	2	7 45 12	11 3 3									
22 14 8	7 45 14	0 7 46 11	8	8 7 11	3	8 6 12	7	8 26 12	3 4 3									
Mean Spring range.						5ft. 10in.						6ft. 2in.						

## Equation of Time at Noon.

L. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
2 32	Sub.	9	10 41	Sub.	17	8 27	Sub.	25	6 2	Sub.
2 20		10	10 26		18	8 10		26	5 44	
2 7		11	10 10		19	7 52		27	5 26	
1 54		12	9 53		20	7 34		28	5 7	
1 41		13	9 37		21	7 16		29	4 49	
1 26		14	9 20		22	6 57		30	4 30	
1 12		15	9 2		23	6 39		31	4 12	
0 57		16	8 45		24	6 21				

High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.

## TIDE TABLES FOR THE

APRIL, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.
S.	1	5 2	7 13	17	2	7 38	16	2	9 5	14	6	9 26	14	3	2 50	12	3	3 13	11	10
S.	2	5 55	8 4	15	2	8 34	14	5	9 48	13	5	10 12	13	3	3 37	11	4	4 2	10	11
M.	3	6 45	9 6	13	9	9 44	13	5	10 40	12	4	11 10	12	6	4 31	10	6	5 2	10	11
Tu.	4	7 33	10 25	13	3	11 8	13	3	11 47	11	9	—	—	—	5 37	9	10	6 16	9	9
W.	5	8 19	11 48	13	5	—	—	—	0 27	12	3	1 8	11	9	6 57	9	9	7 35	9	11
Th.	6	9 2	0 25	13	10	0 57	14	5	1 47	12	7	2 23	12	3	8 13	10	2	8 47	10	11
F.	7	9 45	1 27	14	11	1 48	15	7	2 54	13	3	3 23	13	0	9 18	10	10	9 40	11	11
S.	8	10 27	2 7	16	2	2 26	16	9	3 48	13	11	4 15	13	9	10 11	4	10	10 21	11	7
S.	9	11 9	2 43	17	3	2 59	17	8	4 32	14	6	4 52	14	4	10 39	11	10	10 56	12	6
M.	10	11 52	3 16	18	0	3 33	18	3	5 10	14	11	5 27	14	10	11 12	12	1	11 29	12	6
Tu.	11	morn.	3 48	18	5	4 4	18	6	5 43	15	1	5 59	15	0	11 44	12	3	12 0	12	4
W.	12	0 36	4 21	18	6	4 36	18	6	6 15	15	1	6 32	15	1	—	—	—	0 17	12	4
Th.	13	1 21	4 51	18	5	5 6	18	3	6 47	15	0	7 1	14	11	0 33	12	4	0 50	12	3
F.	14	2 9	5 22	18	0	5 38	17	9	7 15	14	8	7 30	14	8	1 6	12	2	1 22	12	1
S.	15	2 58	5 55	17	6	6 13	17	1	7 46	14	3	8 3	13	9	1 39	12	0	1 55	11	10
S.	16	3 49	6 33	16	7	6 53	16	1	8 20	13	8	8 37	13	9	2 14	11	8	2 34	11	10
M.	17	4 41	7 17	15	7	7 44	15	0	8 56	13	1	9 20	13	3	2 54	11	3	3 17	11	11
Tu.	18	5 34	8 11	14	6	8 43	14	2	9 46	12	6	10 14	12	10	3 42	10	10	4 8	10	7
W.	19	6 26	9 18	14	0	9 58	14	1	10 47	12	1	11 23	12	7	4 39	10	5	5 12	10	3
Th.	20	7 19	10 38	14	4	11 18	14	9	—	—	—	0 5	12	1	5 49	10	2	6 27	10	1
F.	21	8 12	11 58	15	5	—	—	—	0 48	13	0	1 30	12	9	7 6	10	6	7 45	10	11
S.	22	9 6	0 31	16	1	1 2	16	11	2 10	13	10	2 44	13	9	8 20	11	4	8 53	11	9
S.	23	10 0	1 30	17	9	1 55	18	7	3 16	14	10	3 45	14	10	9 22	12	2	9 50	12	7
M.	24	10 56	2 19	19	4	2 42	20	0	4 13	15	8	4 38	15	9	10 15	12	11	10 39	13	2
Tu.	25	11 53	3 6	20	6	3 30	20	9	5 3	16	3	5 27	16	3	11 2	13	4	11 26	13	6
W.	26	0 51	3 54	20	10	4 18	20	8	5 51	16	5	6 15	16	5	11 50	13	6	—	—	—
Th.	27	1 50	4 40	20	6	5 12	20	2	6 38	16	5	7 0	16	3	0 14	13	5	0 38	13	4
F.	28	2 48	5 23	19	9	5 46	19	2	7 21	15	11	7 42	15	10	1 1	13	2	1 24	12	11
S.	29	3 44	6 8	18	7	6 30	17	10	8 1	15	3	8 21	15	2	1 47	12	8	2 10	12	11
S.	30	4 37	6 52	17	0	7 17	16	3	8 41	14	4	9 1	14	3	2 32	12	1	2 54	11	9
Half Mean Spring Range.			9 ft. 6 in.						7 ft. 9 in.						6 ft. 4 in.					
Phases of the Moon.										Moon's Declination at Noon.										
			D.	H.	M.				M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter-			3	1	19	Morning.			1	19	N. 4	9	28	52	17	18	S. 11	25	12	N. 31
Full - - - -			11	4	27	Morning.			2	18	30	10	6	37	18	16	23	26	15	47
Last Quarter-			18	11	20	Afternoon.			3	16	59	11	10	7	19	13	39	27	17	59
New- - - -			25	2	13	Afternoon.			4	14	42	12	13	15	20	10	4	28	18	59
									5	11	48	13	15	50	21	5	49	29	18	48
In Apogee - -			9	4	0	Morning.			6	8	27	14	17	44	22	1	7	30	17	35
In Perigee - -			24	10	0	Morning.			7	4	48	15	18	49	23	3	N. 43			
									8	0	59	16	19	0	24	8	23			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 4 m.

APRIL, 1865.

DOVER.					SHEERNESS.					LONDON.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. L. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.		
2 31 18 2	2 54 17 6	3 57 15 11	4 19 15 5	5 29 19 2	5 51 18 8	5 3								5.3	
3 18 16 8	3 44 16 0	4 43 14 10	5 8 14 4	6 14 18 1	6 40 17 6	6.3								6.3	
4 11 15 3	4 39 14 7	5 36 13 10	6 9 13 5	7 6 16 11	7 36 16 5	7 0								7 0	
5 12 14 2	5 46 14 0	6 45 13 0	7 25 12 10	8 11 16 0	8 51 15 9	8.3								8.3	
6 23 14 0	7 1 14 3	8 7 12 10	8 49 12 11	9 32 15 7	10 13 15 6	9 3								9 3	
7 39 14 8	8 12 15 1	9 26 13 2	10 2 13 5	10 54 15 8	11 29 15 10	10 3								10 3	
8 42 15 7	9 4 16 0	10 33 13 9	11 2 14 1	—	0 1 16 2	11 3								11 3	
9 24 16 5	9 44 16 10	11 22 14 5	11 41 14 8	0 28 16 6	0 51 16 9	12 3								12 3	
0 4 17 2	10 22 17 5	11 59 14 11	—	1 11 17 2	1 29 17 6	13 3								13 3	
0 40 17 9	10 57 17 11	0 16 15 2	0 32 15 5	1 47 17 10	2 2 18 1	14 3								14 3	
1 15 18 0	11 32 18 2	0 49 15 7	1 5 15 8	2 18 18 4	2 34 18 6	0								0	
1 50 18 2	—	1 21 15 9	1 36 15 10	2 50 18 8	3 5 18 9	16 3								16 3	
0 7 18 2	0 24 18 1	1 51 15 10	2 7 15 9	3 21 18 10	3 37 18 10	17 3								17 3	
0 41 18 0	0 59 17 11	2 22 15 8	2 37 15 7	3 51 18 9	4 7 18 8	18 3								18 3	
1 17 17 9	1 35 17 6	2 52 15 5	3 8 15 3	4 24 18 7	4 39 18 5	19 3								19 3	
1 54 17 4	2 15 17 0	3 25 15 1	3 43 14 10	4 56 18 3	5 14 18 0	20 3								20 3	
2 36 16 7	2 58 16 3	4 3 14 7	4 24 14 3	5 33 17 8	5 55 17 5	21 3								21 3	
3 23 15 9	3 49 15 5	4 47 14 0	5 14 13 8	6 18 17 1	6 44 16 9	22 3								22 3	
4 18 15 0	4 49 14 9	5 44 13 5	6 19 13 3	7 12 16 6	7 46 16 3	23 3								23 3	
5 23 14 8	5 57 14 10	6 57 13 2	7 39 13 3	8 25 16 2	9 8 16 2	24 3								24 3	
5 32 15 3	7 11 15 10	8 19 13 5	8 57 13 10	9 47 16 3	10 25 16 6	25 3								25 3	
7 46 16 6	8 17 17 2	9 34 14 3	10 7 14 9	11 2 16 10	11 38 17 3	26 3								26 3	
3 45 17 9	9 13 18 5	10 36 15 2	11 4 15 8	—	0 7 17 9	27 3								27 3	
3 39 19 0	10 4 19 5	11 28 16 0	11 52 16 5	0 34 18 3	0 57 18 9	28 3								28 3	
3 30 19 9	10 55 20 0	—	0 15 16 9	1 22 19 2	1 45 19 6	29 3								29 3	
1 21 20 0	11 47 20 0	0 39 16 11	1 3 17 1	2 8 19 10	2 32 20 1	0 9								0 9	
—	0 12 19 10	1 26 17 2	1 49 17 0	2 54 20 2	3 18 20 2	1 9								1 9	
3 36 19 7	1 1 19 4	2 11 16 10	2 32 16 8	3 40 20 1	4 3 19 11	2 9								2 9	
1 26 18 11	1 49 18 6	2 54 16 5	3 16 16 1	4 25 19 8	4 47 19 3	3 9								3 9	
2 12 17 11	2 35 17 4	3 38 15 8	4 0 15 3	5 8 18 11	5 30 18 5	4 9								4 9	
Mean Spring Tide.					8ft. 0in.					9ft. 7in.					

## Equation of Time at Noon.

M. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
3 54	Sub.	9	1 34	Sub.	17	0 31	Add.	25	2 9	Add.
3 36		10	1 17		18	0 44		26	2 19	
3 18		11	1 1		19	0 58		27	2 29	
3 0		12	0 45		20	1 11		28	2 38	
2 42		13	0 29		21	1 23		29	2 47	
2 25		14	0 13		22	1 36		30	2 55	
2 8		15	0 2	Add.	23	1 47				
1 51		16	0 16		24	1 58				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 Dover subtract 5 m.                      SHEERNESS subtract 3 m.                      LONDON 0 m.

APRIL, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.																								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.																							
		H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																							
S.	1	5 2	3 15	11 4	3 37	11 0	9 55	19 10	10 18	19 1	6 49	13 6	7 14	13 0																													
S.	2	5 55	3 59	10 8	4 23	10 5	10 44	18 3	11 16	17 6	7 40	12 5	8 9	11 10																													
M.	3	6 45	4 50	10 1	5 20	9 10	11 52	16 10	—	—	8 41	11 5	9 16	11 0																													
Tu.	4	7 33	5 52	9 8	6 31	9 7	0 30	16 3	1 7	15 11	9 55	10 9	10 35	10 8																													
W.	5	8 19	7 14	9 6	7 57	9 7	1 44	15 10	2 22	16 0	11 15	10 8	11 49	10 11																													
Th.	6	9 2	8 33	9 9	9 9	9 11	2 56	16 3	3 30	16 10	—	—	0 22	11 2																													
F.	7	9 45	9 40	10 2	10 10	10 4	4 2	17 4	4 31	17 10	0 52	11 7	1 20	11 11																													
S.	8	10 27	10 32	10 7	10 51	10 9	4 51	18 4	5 9	18 9	1 41	12 4	2 2	12 8																													
S.	9	11 9	11 10	10 11	11 28	11 1	5 27	19 2	5 44	19 6	2 22	12 11	2 41	13 2																													
M.	10	11 52	11 45	11 3	—	—	6 1	19 9	6 19	19 11	2 58	13 5	3 14	13 7																													
Tu.	11	morn.	0 2	11 4	0 19	11 4	6 36	20 1	6 52	20 3	3 28	13 9	3 44	13 11																													
W.	12	0 36	0 34	11 5	0 49	11 5	7 8	20 4	7 24	20 4	3 59	14 0	4 15	14 1																													
Th.	13	1 21	1 5	11 4	1 21	11 4	7 40	20 4	7 56	20 3	4 30	14 1	4 45	14 0																													
F.	14	2 9	1 37	11 3	1 52	11 2	8 10	20 2	8 26	19 11	5 0	13 10	5 16	13 7																													
S.	15	2 58	2 8	11 0	2 25	10 11	8 43	19 8	9 0	19 4	5 33	13 5	5 51	13 2																													
S.	16	3 49	2 42	10 9	3 1	10 7	9 19	19 0	9 39	18 7	6 10	12 10	6 32	12 7																													
M.	17	4 41	3 21	10 5	3 41	10 4	9 59	18 2	10 23	17 9	6 54	12 3	7 19	12 0																													
Tu.	18	5 34	4 3	10 2	4 28	10 0	10 52	17 3	11 25	16 11	7 46	11 8	8 16	11 5																													
W.	19	6 26	4 57	9 10	5 29	9 9	—	—	0 4	16 8	8 51	11 3	9 28	11 2																													
Th.	20	7 19	6 4	9 9	6 46	9 10	0 42	16 6	1 19	16 6	10 9	11 2	10 46	11 4																													
F.	21	8 12	7 27	9 11	8 5	10 2	1 54	16 9	2 29	17 4	11 22	11 8	11 56	12 1																													
S.	22	9 6	8 42	10 6	9 14	10 9	3 4	18 1	3 36	18 11	—	—	0 26	12 8																													
S.	23	10 0	9 45	11 1	10 14	11 5	4 5	19 7	4 32	20 3	0 55	13 2	1 23	13 8																													
M.	24	10 56	10 39	11 8	11 4	11 11	4 56	20 10	5 20	21 5	1 50	14 2	2 16	14 6																													
Tu.	25	11 53	11 28	12 1	11 52	12 3	5 44	21 10	6 9	22 1	2 40	14 10	3 3	15 2																													
W.	26	0 51	—	—	0 15	12 4	6 33	22 4	6 57	22 4	3 25	15 4	3 48	15 4																													
Th.	27	1 50	0 38	12 3	1 2	12 2	7 21	22 3	7 45	22 1	4 12	15 4	4 34	15 3																													
F.	28	2 48	1 26	12 0	1 47	11 10	8 6	21 11	8 28	21 6	4 56	15 1	5 18	14 8																													
S.	29	3 44	2 10	11 8	2 33	11 5	8 51	20 11	9 14	20 3	5 42	14 3	6 5	13 10																													
S.	30	4 37	2 56	11 2	3 18	10 11	9 37	19 7	9 59	18 11	6 29	13 4	6 53	12 10																													
Half Mean Spring Range.			5ft. 9in.						10ft. 5in.						7ft. 2in.																												
Phases of the Moon.																						Moon's Declination at Noon.																					
D. H. M.																						M. D. ° ' "																					
First Quarter	3	1	19	Morning.																		1	19	N. 4	9	28	52	17	18	S. 11	25	12	N. 31										
Full	11	4	27	Morning.																		2	18	30	10	6	37	18	16	23	26	15	47										
Last Quarter	18	11	20	Afternoon.																		3	16	59	11	10	7	19	13	39	27	17	59										
New	25	2	13	Afternoon.																		4	14	42	12	13	15	20	10	4	28	18	59										
																						5	11	48	13	15	50	21	5	49	29	18	48										
In Apogee	9	4	0	Morning.																		6	8	27	14	17	44	22	1	7	30	17	35										
In Perigee	24	10	0	Morning.																		7	4	48	15	18	49	23	3	N. 43													
																						8	0	59	16	19	0	24	8	23													

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

HARWICH subtract 5 m.

HULL add 1 m.

SUNDERLAND add 5 m.

APRIL, 1865.

NORTH SHIELDS.					LEITH.					THURSO.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		
5 12 5	7 15	11 11	5 47	15 5	6 12 14 9	—	—	0 4 11 7	5 3						
1 43 11 4	8 14 10 8	6 39 14 1	7 8 13 6	0 31 10 11	1 0 10 5	6 3									
3 48 10 2	9 26 9 10	7 43 13 0	8 20 12 6	1 33 9 11	2 11 9 6	7									
5 8 9 8	10 48 9 7	9 1 12 3	9 42 12 2	2 53 9 3	3 37 9 1	8 3									
1 27 9 9	—	10 21 12 3	10 55 12 5	4 20 9 1	4 56 9 2	9 3									
3 2 9 11	0 35 10 2	11 20 12 9	11 59 13 1	5 31 9 4	6 0 9 9	10 3									
5 4 10 6	1 31 10 9	—	0 25 13 5	6 27 10 2	6 46 10 8	11 3									
1 50 11 1	2 8 11 5	0 45 13 10	1 3 14 3	7 1 11 1	7 17 11 6	12 3									
3 26 11 9	2 43 12 1	1 21 14 8	1 39 15 0	7 32 11 11	7 46 12 3	13 3									
5 58 12 3	3 14 12 6	1 55 15 4	2 11 15 7	8 1 12 7	8 15 12 9	14 3									
3 29 12 8	3 44 12 9	2 28 15 9	2 43 15 10	8 31 12 10	8 45 12 11	15 3									
5 59 12 10	4 15 12 11	2 57 15 11	3 12 15 11	9 0 12 11	9 15 12 10	16 3									
1 31 12 10	4 47 12 8	3 27 15 10	3 43 15 8	9 31 12 8	9 48 12 6	17 3									
3 32 12 6	5 20 12 4	3 58 15 6	4 14 15 4	10 5 12 4	10 22 12 1	18 3									
5 37 12 2	5 55 12 0	4 31 15 1	4 49 14 11	10 40 11 10	11 0 11 6	19 3									
1 14 11 9	6 35 11 6	5 8 14 8	5 30 14 5	11 22 11 2	11 44 10 11	20 3									
3 56 11 3	7 21 10 11	5 52 14 1	6 18 13 8	—	0 9 10 7	21 3									
5 50 10 7	8 22 10 3	6 45 13 4	7 17 13 1	0 37 10 2	1 8 10 0	22 3									
1 0 10 1	9 40 10 0	7 54 12 10	8 32 12 9	1 45 9 9	2 24 9 8	23 3									
3 21 10 1	10 58 10 4	9 15 12 9	9 53 13 0	3 8 9 8	3 51 9 10	24 3									
5 35 10 9	—	10 28 13 4	11 3 13 9	4 28 10 1	5 5 10 5	25 3									
1 9 11 1	0 40 11 7	11 33 14 3	—	5 35 10 11	6 3 11 6	26 3									
3 7 12 0	1 32 12 6	0 1 14 9	0 26 15 4	6 27 12 2	6 48 12 10	27 3									
5 56 12 11	2 19 13 5	0 50 15 11	1 14 16 6	7 9 13 4	7 29 13 11	28 3									
1 41 13 9	3 3 14 1	1 38 16 11	2 1 17 3	7 50 14 3	8 12 14 6	29 3									
3 26 14 3	3 49 14 4	2 24 17 6	2 46 17 6	8 34 14 6	8 57 14 4	30 3									
4 13 14 3	4 36 14 0	3 9 17 5	3 31 17 2	9 20 14 2	9 43 13 10	31 3									
4 59 13 9	5 22 13 5	3 53 16 10	4 16 16 6	10 6 13 6	10 30 13 1	32 3									
5 46 13 1	6 9 12 8	4 40 16 1	5 3 15 8	10 54 12 7	11 18 12 0	33 3									
6 32 12 3	6 56 11 9	5 27 15 2	5 51 14 8	11 43 11 6	—	—									
an Spring } 6ft. 8in. nge.					8ft. 2in.					6ft. 7in.					

Mean Spring } 6 ft. 8 in.  
Tide. }  
Mean Spring }  
Tide. }

8 ft. 2 in.

6 ft. 7 in.

## Equation of Time at Noon.

L. S.		M.D.	M. S.		M.D.	M. S.		M.D.	M. S.	
3 54	Sub.	9	1 34	Sub.	17	0 31	Add.	25	2 9	Add.
3 36		10	1 17		18	0 44		26	2 19	
3 18		11	1 1		19	0 58		27	2 29	
3 0		12	0 45		20	1 11		28	2 38	
2 42		13	0 29		21	1 23		29	2 47	
2 25		14	0 13		22	1 36		30	2 55	
2 8		15	0 2	Add.	23	1 47				
1 51		16	0 16		24	1 58				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—For  
NORTH SHIELDS add 6 m. LEITH add 13 m. THURSO add 14 m.

APRIL, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
S.	1	5a 2	3 14	9 7	3 36	9 4	2 24	24 9	2 46	23 9	9 37	19 2	10 0	18 1									
S.	2	5 55	4 0	9 1	4 26	8 10	3 11	22 9	3 38	21 9	10 34	17 5	10 49	16 6									
M.	3	6 45	4 55	8 7	5 27	8 4	4 9	20 10	4 44	20 0	11 14	15 8	11 49	13 2									
Tu.	4	7 33	6 3	8 2	6 42	8 1	5 25	19 8	6 7	19 6	—	—	0 24	15 6									
W.	5	8 19	7 23	8 0	8 0	8 1	6 52	19 8	7 29	19 11	1 5	15 0	1 47	15 2									
Th.	6	9 2	8 37	8 3	9 9	8 5	8 5	20 7	8 36	21 1	2 28	15 7	3 2	16 2									
F.	7	9 45	9 39	8 7	10 2	8 9	9 4	21 9	9 24	22 5	3 35	16 10	3 59	17 6									
S.	8	10 27	10 22	8 11	10 41	9 0	9 43	23 0	10 1	23 7	4 21	18 0	4 43	18 7									
S.	9	11 9	11 0	9 1	11 19	9 2	10 17	24 0	10 33	24 4	5 5	19 1	5 24	19 3									
M.	10	11 52	11 37	9 3	11 54	9 4	10 50	24 8	11 7	24 11	5 42	19 9	5 59	20 0									
Tu.	11	morn.	—	—	0 11	9 5	11 23	25 1	11 39	25 3	6 15	20 2	6 30	20 4									
W.	12	0 36	0 27	9 6	0 44	9 6	11 56	25 4	—	—	6 47	20 5	7 3	20 5									
Th.	13	1 21	1 0	9 6	1 16	9 6	0 11	25 4	0 27	25 3	7 18	20 4	7 33	20 3									
F.	14	2 9	1 32	9 6	1 48	9 5	0 43	25 1	0 59	24 10	7 48	19 11	8 4	19 8									
S.	15	2 58	2 5	9 5	2 21	9 4	1 15	24 5	1 31	24 1	8 22	19 4	8 41	19 0									
S.	16	3 49	2 39	9 3	2 58	9 1	1 49	23 7	2 8	23 1	9 0	18 6	9 19	18 1									
M.	17	4 41	3 17	9 0	3 40	8 11	2 28	22 7	2 51	22 1	9 40	17 7	10 4	17 1									
Tu.	18	5 34	4 6	8 9	4 33	8 8	3 17	21 6	3 44	21 0	10 29	16 8	10 55	16 0									
W.	19	6 26	5 4	8 6	5 38	8 5	4 19	20 6	4 56	20 4	11 25	15 11	11 59	15 10									
Th.	20	7 19	6 16	8 4	6 53	8 4	5 39	20 4	6 22	20 9	—	—	0 34	16 0									
F.	21	8 12	7 31	8 6	8 9	8 9	7 1	21 4	7 38	22 2	1 16	16 6	1 59	17 1									
S.	22	9 6	8 43	8 11	9 15	9 2	8 11	23 0	8 39	23 11	2 35	17 11	3 10	18 9									
S.	23	10 0	9 43	9 5	10 10	9 7	9 6	24 10	9 30	25 8	3 41	18 8	4 10	20 5									
M.	24	10 56	10 36	9 9	11 1	9 11	9 53	26 5	10 16	27 0	4 38	21 2	5 5	21 9									
Tu.	25	11 53	11 27	10 1	11 52	10 2	10 40	27 5	11 4	27 9	5 32	22 3	5 56	22 6									
W.	26	on 51	—	—	0 17	10 3	11 28	27 10	11 53	27 10	6 20	22 8	6 44	22 8									
Th.	27	1 50	0 41	10 3	1 5	10 2	—	—	0 16	27 7	7 6	22 5	7 28	23 1									
F.	28	2 48	1 28	10 1	1 50	10 0	0 39	27 3	1 12	26 9	7 50	21 8	8 14	21 1									
S.	29	3 44	2 12	9 10	2 34	9 8	1 23	26 1	1 45	25 3	8 37	20 5	8 59	19 9									
S.	30	4 37	2 56	9 6	3 17	9 3	2 7	24 5	2 28	23 6	9 20	18 11	9 41	18 3									
Half Mean Spring Range.			4 ft. 10 in.						13 ft. 0 in.						10 ft. 6 in.								
Phases of the Moon.												Moon's Declination at Noon.											
D. H. M.												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter 3 1 19 Morning.												1	19	N. 4	9	28	52	17	18	S. 11	25	12	N. 31
Full - - - - 11 4 27 Morning.												2	18	30	10	6	37	18	16	23	26	15	47
Last Quarter - 18 11 20 Afternoon.												3	16	59	11	10	7	19	13	39	27	17	59
New - - - - 25 2 13 Afternoon.												4	14	42	12	13	15	20	10	4	28	18	59
												5	11	48	13	15	50	21	5	49	29	18	48
In Apogee - - 9 4 0 Morning.												6	8	27	14	17	44	22	1	7	30	17	35
In Perigee - - 24 10 0 Morning.												7	4	48	15	18	49	23	3	N. 43			
												8	0	59	16	19	0	24	8	23			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for

GREENOCK add 19 m.

LIVERPOOL add 12 m.

PEMBROKE add 20 m.



APRIL, 1864.

WESTON-SUPER-MARE.					HOLYHEAD.					KINGSTOWN.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.			Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		
10 10 34 8		10 29 33 1		1 21 15 3		1 45 14 8		2 21 10 4		2 45 10 0		5'3			
10 50 31 7		11 16 30 2		2 12 14 0		2 41 13 5		3 11 9 8		3 39 9 5		6'3			
11 47 28 11		—		3 14 12 11		3 52 12 6		4 13 9 1		4 50 8 10		7'3			
0 23 28 2		1 12 27 10		4 34 12 4		5 15 12 3		5 27 8 8		6 4 8 7		8'3			
1 43 27 10		2 22 28 1		5 55 12 4		6 29 12 6		6 41 8 9		7 16 8 11		9'3			
3 0 28 8		3 36 29 6		7 3 12 10		7 32 13 2		7 50 9 1		8 22 9 3		10'3			
4 11 30 5		4 37 31 5		8 0 13 6		8 20 13 10		8 52 9 5		9 14 9 8		11'3			
5 1 32 4		5 24 33 3		8 38 14 2		8 56 14 6		9 35 9 10		9 55 10 1		12'3			
5 45 34 0		6 4 34 7		9 12 14 10		9 28 15 0		10 12 10 3		10 27 10 4		13'3			
6 23 35 2		6 41 35 6		9 45 15 3		10 1 15 5		10 42 10 6		10 57 10 7		14'3			
6 57 35 10		7 13 36 11		10 16 15 6		10 30 15 7		11 12 10 8		11 27 10 9		15'3			
7 30 36 3		7 46 36 4		10 44 15 7		10 58 15 7		11 43 10 9		11 59 10 8		16'3			
8 1 36 2		8 16 35 11		11 13 15 6		11 28 15 4		—		0 16 10 5		17'3			
8 31 35 8		8 47 35 8		11 45 15 2		—		0 32 10 6		0 49 10 5		18'3			
9 2 34 11		9 19 34 5		0 3 15 0		0 21 14 9		1 6 10 4		1 24 10 2		19'3			
9 36 33 8		9 53 32 11		0 42 14 6		1 4 14 2		1 43 10 0		2 4 9 2		20'3			
10 11 32 2		10 32 31 3		1 27 13 11		1 51 13 7		2 26 9 7		2 50 9 6		21'3			
10 56 30 6		11 24 29 9		2 18 13 3		2 49 13 0		3 17 9 4		3 47 9 2		22'3			
11 58 29 3		—		3 26 12 10		4 5 12 9		4 24 9 0		5 2 8 11		23'3			
0 35 29 2		1 13 29 6		4 48 12 10		5 26 13 0		5 39 8 11		6 15 8 12		24'3			
1 52 30 2		2 32 31 2		6 2 13 5		6 37 13 10		6 50 9 4		7 24 9 7		25'3			
3 9 32 4		3 45 33 7		7 7 14 4		7 35 14 10		7 56 9 11		8 27 10 2		26'3			
4 19 34 11		4 51 36 3		8 2 15 4		8 26 15 10		8 56 10 6		9 24 10 9		27'3			
5 19 37 6		5 46 38 5		8 49 16 3		9 11 16 8		9 48 11 0		10 10 11 3		28'3			
6 12 39 2		6 38 39 7		9 34 16 11		9 57 17 11		10 32 11 5		10 54 11 7		29'3			
7 3 39 10		7 27 39 11		10 19 17 2		10 41 17 11		11 17 11 8		11 40 11 7		30'3			
7 50 39 7		8 11 39 11		11 2 16 11		11 23 16 8		—		0 3 11 5		1'9			
8 33 38 6		8 54 37 8		11 47 16 5		—		0 26 11 3		0 50 11 1		2'9			
9 14 36 9		9 34 35 7		0 12 16 0		0 37 15 6		1 14 10 10		1 38 10 6		3'9			
9 53 34 4		10 12 33 2		1 1 15 0		1 25 14 6		2 1 10 3		2 25 10 0		4'9			
Mean Spring Range. } 18ft. 7in.					8ft. 0in.					5ft. 6in.					

Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
3 54		9	1 34		17	0 31		25	2 9	
3 36		10	1 17		18	0 44		26	2 19	
3 18		11	1 1		19	0 58		27	2 29	
3 0		12	0 45		20	1 11		28	2 38	
2 42		13	0 29		21	1 23		29	2 47	
2 25		14	0 13		22	1 36		30	2 55	
2 8		15	0 2	Add.	23	1 47				
1 51		16	0 16		24	1 58				

as of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. ! HOLYHEAD add 12 m. ! KINGSTOWN subtract 1 m. for Dublin Time.



TIDE TABLES FOR THE

APRIL, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
S.	1	5 2	2 0	9 2	2 26	8 11	11 27	6 8	12 0	6 3	8 46	9 9	9 14										
S.	2	5 55	2 54	8 8	3 23	8 6	—	—	0 37	5 10	9 47	8 10	10 23										
M.	3	6 45	3 56	8 3	4 31	8 1	1 18	5 8	2 2	5 6	11 1	8 3	11 40										
Tu.	4	7 33	5 8	8 0	5 45	7 11	2 45	5 5	3 23	5 7	—	—	0 19										
W.	5	8 19	6 25	7 11	7 1	7 11	4 0	5 9	4 31	5 11	0 59	8 2	1 35										
Th.	6	9 2	7 37	8 0	8 7	8 2	4 59	6 1	5 24	6 3	2 9	8 5	2 39										
F.	7	9 45	8 34	8 4	8 53	8 7	5 47	6 5	6 4	6 7	3 5	9 0	3 25										
S.	8	10 27	9 12	8 9	9 31	8 11	6 22	6 9	6 41	6 11	3 41	9 8	3 58										
S.	9	11 9	9 48	9 0	10 5	9 1	6 59	7 1	7 16	7 2	4 14	10 2	4 30										
M.	10	11 52	10 21	9 2	10 36	9 3	7 34	7 3	7 51	7 4	4 47	10 7	5 4										
Tu.	11	morn.	10 52	9 3	11 6	9 4	8 6	7 5	8 20	7 6	5 20	10 10	5 36										
W.	12	0 36	11 21	9 3	11 36	9 3	8 35	7 6	8 48	7 6	5 52	11 0	6 6										
Th.	13	1 21	11 51	9 3	—	—	9 3	7 4	9 17	7 3	6 21	10 10	6 37										
F.	14	2 9	0 7	9 2	0 24	9 2	9 32	7 1	9 48	7 0	6 53	10 6	7 10										
S.	15	2 58	0 42	9 1	1 0	9 0	10 4	6 10	10 22	6 8	7 27	10 0	7 46										
S.	16	3 49	1 21	8 11	1 43	8 10	10 42	6 6	11 5	6 3	8 5	9 6	8 27										
M.	17	4 41	2 7	8 8	2 33	8 7	11 36	6 1	—	—	8 52	9 0	9 23										
Tu.	18	5 34	3 1	8 5	3 31	8 4	0 10	5 10	0 48	5 8	9 56	8 6	10 35										
W.	19	6 26	4 6	8 3	4 43	8 2	1 31	5 7	2 17	5 8	11 14	8 5	11 54										
Th.	20	7 19	5 21	8 2	5 57	8 2	2 58	5 9	3 34	6 0	—	—	0 31										
F.	21	8 12	6 33	8 3	7 10	8 4	4 6	6 4	4 35	6 8	1 7	8 11	1 43										
S.	22	9 6	7 41	8 7	8 9	8 10	4 59	6 11	5 23	7 2	2 14	9 7	2 41										
S.	23	10 0	8 35	9 1	9 0	9 4	5 46	7 5	6 10	7 8	3 6	10 5	3 28										
M.	24	10 56	9 24	9 7	9 47	9 9	6 35	7 11	6 59	8 1	3 50	11 3	4 13										
Tu.	25	11 53	10 10	9 10	10 33	9 11	7 24	8 3	7 48	8 4	4 37	11 10	5 1										
W.	26	0a 51	10 56	9 11	11 19	9 10	8 10	8 5	8 32	8 4	5 25	12 1	5 48										
Th.	27	1 50	11 40	9 9	—	—	8 52	8 2	9 12	8 0	6 10	11 11	6 32										
F.	28	2 48	0 2	9 8	0 26	9 7	9 33	7 9	9 55	7 6	6 55	11 4	7 18										
S.	29	3 44	0 51	9 5	1 15	9 4	10 17	7 3	10 40	6 11	7 41	10 6	8 3										
S.	30	4 37	1 40	9 2	2 6	8 11	11 4	6 7	11 35	6 4	8 26	9 8	8 52										
Half Mean Spring Range.			4ft. 9in.						3ft. 10in.						5ft. 7in.								
Phases of the Moon.												Moon's Declination at Noon.											
D. H. M.												M.D. ° ' M.D. ° ' M.D. ° ' M.D. ° '											
First Quarter- 3 1 19 Morning.												1 19 N. 4 9 28.52 17 18 S. 11 25 1											
Full - - - - 11 4 27 Morning.												2 18 30 10 6 37 18 16 23 26 1											
Last Quarter- 18 11 20 Afternoon.												3 16 59 11 10 7 19 13 39 27 1											
New - - - - 25 2 13 Afternoon.												4 14 42 12 13 15 20 10 4 28 1											
												5 11 48 13 15 50 21 5 49 29 1											
												6 8 27 14 17 44 22 1 7 30 1											
												7 4 48 15 18 49 23 3 N. 43											
												8 0 59 16 19 0 24 8 23											

The times for High Water are given for Mean Time at Place ; if Dublin or Railway Time be required BELFAST subtract 2 m. LONDONDERRY add 4 m. SLIGO BAY add 6

APRIL, 1865.

MONTH DAY.	GALWAY.								QUEENSTOWN.								WATERFORD.								C's AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	D.						
1	8 10 13 4	8 36 12 6	8 28 10 10	8 50 10 4	8 46 11 10	9 7 11 4	5'3																		
2	9 4 11 10	9 35 11 3	9 15 9 11	9 41 9 6	9 29 10 11	9 58 10 6	6'3																		
3	10 10 10 9	10 49 10 6	10 11 9 2	10 48 8 11	10 33 10 1	11 9 9 9	7																		
4	11 30 10 6	—	11 27 8 10	—	11 45 9 7	—	8'3																		
5	0 11 10 6	0 46 10 8	0 9 8 10	0 47 8 11	0 22 9 7	0 58 9 8	9'3																		
6	1 21 11 0	1 50 11 5	1 24 9 2	1 59 9 5	1 33 9 10	2 7 10 2	10'3																		
7	2 17 11 10	2 38 12 3	2 31 9 8	2 54 9 11	2 42 10 5	3 7 10 9	11'3																		
8	2 57 12 7	3 16 12 11	3 15 10 3	3 35 10 6	3 29 11 0	3 53 11 3	12'3																		
9	3 34 13 3	3 50 13 6	3 55 10 9	4 13 10 11	4 14 11 6	4 34 11 8	13'3																		
10	4 7 13 9	4 23 14 0	4 30 11 1	4 47 11 3	4 53 11 10	5 10 11 11	14'3																		
11	4 39 14 2	4 54 14 4	5 3 11 4	5 20 11 5	5 26 12 0	5 41 12 1	15'3																		
12	5 10 14 5	5 26 14 5	5 37 11 6	5 53 11 5	5 57 12 1	6 13 12 1	16'3																		
13	5 42 14 3	5 58 14 1	6 9 11 5	6 24 11 4	6 29 12 1	6 45 12 0	17'3																		
14	6 14 13 11	6 31 13 9	6 40 11 3	6 57 11 1	7 2 12 0	7 18 11 11	18'3																		
15	6 49 13 6	7 8 13 3	7 14 10 11	7 32 10 9	7 34 11 10	7 52 11 8	19'3																		
16	7 29 12 11	7 51 12 6	7 51 10 6	8 10 10 3	8 11 11 6	8 29 11 3	20'3																		
17	8 15 12 2	8 42 11 8	8 31 10 0	8 55 9 9	8 48 11 0	9 10 10 9	21'3																		
18	9 11 11 4	9 45 11 1	9 21 9 7	9 49 9 4	9 35 10 7	10 8 10 4	22'3																		
19	10 22 10 11	11 3 11 0	10 22 9 3	11 1 9 3	10 44 10 2	11 21 10 1	23'3																		
20	11 42 11 3	—	11 39 9 4	—	11 56 10 1	—	24'3																		
21	0 19 11 8	0 55 12 2	0 17 9 7	0 55 9 11	0 31 10 4	1 6 10 8	25'3																		
22	1 25 12 9	1 53 13 3	1 32 10 3	2 6 10 7	1 41 11 0	2 16 11 5	26'3																		
23	2 20 13 10	2 46 14 5	2 35 11 0	3 4 11 5	2 49 11 10	3 20 12 2	27'3																		
24	3 10 14 11	3 33 15 3	3 30 11 10	3 55 12 1	3 48 12 7	4 16 12 10	28'3																		
25	3 57 15 8	4 21 15 11	4 20 12 4	4 44 12 6	4 43 13 1	5 7 13 2	29'3																		
26	4 44 16 1	5 7 16 1	5 9 12 7	5 33 12 7	5 30 13 2	5 54 13 3	30'3																		
27	5 30 15 11	5 53 15 7	5 57 12 6	6 20 12 4	6 17 13 2	6 40 13 0	31'3																		
28	6 16 15 3	6 40 14 10	6 42 12 1	7 5 11 10	7 4 12 10	7 26 12 7	32'3																		
29	7 3 14 4	7 26 13 9	7 27 11 5	7 49 11 1	7 47 12 4	8 9 12 0	33'3																		
30	7 50 13 2	8 15 12 7	8 10 10 9	8 31 10 4	8 28 11 8	8 49 11 4	34'3																		
If Mean Spring } Range. }								5ft 10in.								6ft. 2in.									

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
3 54		9	1 34		17	0 31		25	2 9	
3 36		10	1 17		18	0 44		26	2 19	
3 18		11	1 1		19	0 58		27	2 29	
3 0		12	0 45		20	1 11		28	2 38	
2 42		13	0 29		21	1 23		29	2 47	
2 25		14	0 13		22	1 36		30	2 55	
2 8		15	0 2	Add.	23	1 47				
1 51		16	0 16		24	1 58				

Times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
**GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.**

MAY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.								DEVONPORT.								PORTSMOUTH.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.			
			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.		
			H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	
M.	1	5a27	7 43	15 5	8 10	14 8	9 24	13 4	9 48	13 4	3 17	11 5	3 43	11 4												
Tu.	2	6 15	8 39	14 1	9 9	13 8	10 12	12 4	10 39	12 7	4 7	10 8	4 34	10 4												
W.	3	6 59	9 44	13 6	10 22	13 6	11 8	11 8	11 44	12 3	5 4	10 1	5 37	9 11												
Th.	4	7 42	10 58	13 6	11 33	13 9	—	—	0 24	11 8	6 13	9 10	6 47	9 10												
F.	5	8 25	—	—	0 7	14 1	1 0	12 5	1 35	12 1	7 21	10 0	7 54	10 0												
S.	6	9 7	0 34	14 6	1 2	14 11	2 10	12 11	2 38	12 10	8 24	10 6	8 53	10 6												
S.	7	9 49	1 28	15 5	1 47	15 11	3 6	13 6	3 31	13 7	9 20	11 0	9 41	11 0												
M.	8	10 33	2 6	16 5	2 25	16 10	3 54	14 1	4 16	14 1	10 11	11 6	10 20	11 8												
Tu.	9	11 18	2 42	17 3	2 59	17 8	4 36	14 5	4 55	14 6	10 37	11 10	10 55	11 12												
W.	10	morn.	3 17	17 11	3 35	18 0	5 13	14 9	5 31	14 10	11 14	12 0	11 31	12 0												
Th.	11	0 5	3 53	18 1	4 10	18 1	5 47	14 11	6 4	15 0	11 49	12 2	—	—												
F.	12	0 55	4 27	18 1	4 45	18 1	6 21	14 11	6 38	15 1	0 6	12 2	0 24	12 2												
S.	13	1 46	5 2	18 0	5 20	17 10	6 55	14 9	7 11	15 0	0 43	12 1	1 2	12 0												
S.	14	2 38	5 38	17 8	5 59	17 5	7 28	14 6	7 47	14 8	1 20	12 0	1 40	11 22												
M.	15	3 30	6 21	17 1	6 43	16 8	8 7	14 0	8 26	14 4	2 0	11 10	2 21	11 8												
Tu.	16	4 23	7 6	16 3	7 32	15 11	8 47	13 6	9 9	13 10	2 43	11 7	3 7	11 3												
W.	17	5 15	8 0	15 5	8 30	15 1	9 34	13 0	10 1	13 4	3 31	11 3	3 58	11 1												
Th.	18	6 7	9 2	14 11	9 36	14 11	10 33	12 7	11 7	13 1	4 27	10 11	4 58	10 2												
F.	19	6 58	10 13	15 1	10 49	15 4	11 43	12 6	—	—	5 30	10 8	6 4	10 2												
S.	20	7 50	11 25	15 8	12 0	16 2	0 24	13 3	1 4	13 1	6 38	10 9	7 13	11 2												
S.	21	8 43	—	—	0 31	16 8	1 43	13 11	2 19	13 11	7 48	11 4	8 21	11 4												
M.	22	9 38	1 0	17 3	1 29	17 11	2 50	14 7	3 21	14 9	8 52	12 0	9 23	12 0												
Tu.	23	10 34	1 57	18 6	2 23	19 0	3 50	15 2	4 18	15 4	9 53	12 6	10 19	12 1												
W.	24	11 32	2 47	19 5	3 12	19 8	4 44	15 7	5 9	15 9	10 44	12 10	11 8	12 1												
Th.	25	on31	3 36	19 9	4 1	19 8	5 33	15 11	5 57	16 0	11 33	13 0	11 58	13 0												
F.	26	1 29	4 24	19 7	4 46	19 5	6 20	15 10	6 45	16 1	—	—	0 22	12 1												
S.	27	2 24	5 7	19 1	5 29	18 8	7 0	15 7	7 22	15 9	0 45	12 9	1 8	12 0												
S.	28	3 17	5 51	18 3	6 13	17 10	7 42	15 0	8 2	15 2	1 31	12 5	1 52	12 0												
M.	29	4 7	6 35	17 2	6 57	16 7	8 21	14 3	8 40	14 5	2 14	12 0	2 36	11 0												
Tu.	30	4 54	7 20	16 0	7 44	15 5	8 59	13 5	9 20	13 7	2 58	11 6	3 20	11 0												
W.	31	5 38	8 7	14 10	8 32	14 4	9 40	12 7	10 2	12 9	3 43	11 0	4 6	10 0												
Half Mean Spring } Range.			9ft. 6in.				7ft. 9in.				6ft. 4in.															
Phases of the Moon.												Moon's Declination at Noon.														
												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'			
First Quarter												1	15	N.29	9	12	8.27	17	11	8.6	25	18	N.4			
Full												2	12	42	10	15	13	18	7	7	26	19	1			
Last Quarter												3	9	26	11	17	21	19	2	39	27	18	11			
New												4	5	50	12	18	40	20	2	N.1	28	16	2			
												5	2	2	13	19	5	21	6	39	29	13	5			
In Apogee												6	1	8.49	14	18	30	22	10	56	30	10	4			
In Perigee												7	5	36	15	16	56	23	14	32	31	7				
												8	9	12	16	14	26	24	17	12						

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,  
 BREST add 18 m.      DEVONPORT add 17 m.      PORTSMOUTH add 4 m.

MAY, 1865.

MONTH DAY.	DOVER.						SHEERNESS.						LONDON.						C's AGE at Noon.				
	MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.							
	Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.		Time. H. M. F.	Height. F. I.						
1	2 58	16	9	3 23	16	2	4 23	14	9	4 47	14	4	5 53	18	0	6 18	17	6	5'9				
2	3 48	15	7	4 14	15	0	5 14	13	11	5 43	13	7	6 44	17	0	7 11	16	7	5				
3	4 41	14	6	5 11	14	3	6 14	13	3	6 48	13	0	7 42	16	3	8 16	15	11	7'9				
4	5 42	14	2	6 14	14	2	7 24	12	11	8 4	12	11	8 53	15	10	9 29	15	8	8'9				
5	6 47	14	5	7 20	14	10	8 39	13	1	9 12	13	3	10 3	15	8	10 38	15	10	9'9				
6	7 49	15	2	8 18	15	6	9 44	13	7	10 11	13	10	11 13	16	0	11 43	16	3	10'9				
7	8 43	15	11	9 4	16	3	10 38	14	1	11 2	14	4	—	—	—	0 9	16	6	11'9				
8	9 24	16	7	9 44	16	11	11 21	14	7	11 39	14	10	0 32	16	9	0 51	17	0	12'9				
9	10 3	17	2	10 23	17	5	11 57	15	0	—	—	—	1 11	17	4	1 31	17	7	13'9				
10	10 42	17	8	11 1	17	9	0 14	15	2	0 32	15	4	1 48	17	10	2 4	18	1	14'9				
11	11 21	17	10	11 39	17	10	0 50	15	6	1 8	15	7	2 20	18	3	2 37	18	4	15'9				
12	11 58	17	11	—	—	—	1 25	15	8	1 42	15	7	2 56	18	6	3 12	18	7	16'9				
13	0 18	18	0	0 37	17	10	1 59	15	7	2 16	15	6	3 29	18	7	3 45	18	7	17'9				
14	0 57	17	9	1 18	17	8	2 33	15	5	2 50	15	4	4 2	18	6	4 21	18	5	18'9				
15	1 40	17	6	2 2	17	4	3 8	15	3	3 29	15	1	4 40	18	4	4 59	18	2	19'9				
16	2 24	17	1	2 47	16	9	3 50	14	10	4 12	14	7	5 20	18	0	5 40	17	9	20'9				
17	3 12	16	6	3 39	16	2	4 37	14	5	5 2	14	2	6 3	17	7	6 30	17	4	21'9				
18	4 7	15	11	4 36	15	8	5 32	14	0	6 5	13	10	6 57	17	1	7 27	16	11	22'9				
19	5 5	15	5	5 35	15	6	6 40	13	8	7 16	13	8	8 2	16	9	8 41	16	8	23'9				
20	6 6	15	8	6 39	16	0	7 55	13	10	8 30	14	1	9 20	16	9	9 56	16	10	24'9				
21	7 14	16	6	7 46	17	0	9 4	14	5	9 37	14	9	10 33	17	1	11 8	17	4	25'9				
22	8 16	17	5	8 46	17	10	10 7	15	1	10 35	15	5	11 40	17	7	—	—	—	26'9				
23	9 16	18	3	9 43	18	7	11 3	15	8	11 37	15	11	0 9	17	11	0 36	18	3	27'9				
24	10 10	18	11	10 36	19	11	11 56	16	2	—	—	—	1 3	18	7	1 29	18	11	28'9				
25	11 3	19	2	11 30	19	2	0 21	16	5	0 45	16	6	1 54	19	2	2 17	19	4	29'9				
26	11 56	19	1	—	—	—	1 9	16	7	1 33	16	6	2 40	19	6	3 4	19	6	30'9				
27	0 19	19	0	0 43	18	9	1 56	16	5	2 17	16	3	3 26	19	6	3 47	19	5	31'9				
28	1 8	18	6	1 31	18	2	2 38	16	1	2 59	15	10	4 7	19	3	4 29	19	0	32'9				
29	1 54	17	10	2 17	17	5	3 21	15	6	3 43	15	3	4 51	18	9	5 12	18	5	33'9				
30	2 39	17	0	3 1	16	6	4 5	14	11	4 27	14	7	5 34	18	1	5 57	17	9	34'9				
31	3 24	16	1	3 47	15	8	4 50	14	3	5 14	13	11	6 20	17	5	6 45	17	0	35'9				
Half Mean Spring } Range.						9ft. 4in.						8ft. 0in.						9ft. 7in.					

Half Mean Spring  
Range.

9ft. 4in.

8ft. 0in.

9ft. 7in.

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
3 3		9	3 45		17	3 51		25	3 20	
3 10		10	3 48		18	3 49		26	3 14	
3 17		11	3 50		19	3 47		27	3 8	
3 23		12	3 52		20	3 44		28	3 0	
3 28		13	3 53		21	3 40		29	2 53	
3 33		14	3 53		22	3 36		30	2 45	
3 38		15	3 53		23	3 31		31	2 36	
3 42		16	3 52		24	3 26				

Times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 Dover subtract 5 m.      SHEERNESS subtract 3 m.      LONDON 0 m.

MAY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.																
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.												
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.															
			H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.								
M.	1	5a27	3	40	10	8	4	3	10	5	10	23	18	4	10	52	17	8	7	19	12	5	7	46	11	11	11	11							
Tu.	2	6 15	4	28	10	2	4	56	9	11	11	24	17	1	11	58	16	7	8	15	11	7	8	45	11	7	8	45							
W.	3	6 59	5	24	9	9	5	55	9	7	—	—	—	—	0	33	16	3	9	19	11	0	9	55	10	10	10	10							
Th.	4	7 42	6	31	9	7	7	12	9	7	1	7	16	1	1	40	16	0	10	32	10	9	11	5	10	10	10	10							
F.	5	8 25	7	47	9	8	8	20	9	10	2	12	16	2	2	42	16	6	11	36	11	0	—	—	—	—	—	—							
S.	6	9 7	8	51	10	0	9	18	10	2	3	11	17	0	3	39	17	5	0	3	11	4	0	30	11	8	11	8							
S.	7	9 49	9	45	10	4	10	11	10	6	4	7	17	10	4	31	18	3	0	57	11	11	1	21	12	3	12	3							
M.	8	10 33	10	32	10	8	10	50	10	10	4	50	18	7	5	8	18	11	1	42	12	6	2	2	13	0	2	13							
Tu.	9	11 18	11	9	11	0	11	27	11	1	5	26	19	3	5	43	19	5	2	21	13	0	2	39	13	4	2	39							
W.	10	morn.	11	45	11	2	—	—	—	—	6	1	19	8	6	20	19	10	2	57	13	4	3	14	13	6	3	14							
Th.	11	0 5	0	4	11	3	0	21	11	3	6	39	19	11	6	56	20	0	3	31	13	8	3	48	13	5	3	48							
F.	12	0 55	0	38	11	3	0	54	11	3	7	13	20	0	7	31	20	0	4	5	13	9	4	22	13	8	4	22							
S.	13	1 46	1	12	11	2	1	30	11	1	7	49	20	0	8	6	19	11	4	39	13	9	4	56	13	8	4	56							
S.	14	2 38	1	48	11	0	2	6	10	11	8	24	19	9	8	43	19	7	5	14	13	6	5	34	13	4	5	34							
M.	15	3 30	2	26	10	10	2	47	10	9	9	5	19	3	9	27	19	0	5	55	13	1	6	18	12	11	6	18							
Tu.	16	4 23	3	9	10	8	3	31	10	6	9	49	18	8	10	12	18	4	6	42	12	8	7	8	12	4	7	8							
W.	17	5 15	3	53	10	5	4	17	10	3	10	38	18	1	11	11	17	9	7	35	12	3	8	5	12	4	8	5							
Th.	18	6 7	4	46	10	2	5	16	10	1	11	47	17	6	—	—	—	8	37	11	10	9	11	11	4	9	11								
F.	19	6 58	5	48	10	1	6	22	10	1	0	25	17	4	1	0	17	3	9	47	11	8	10	22	11	4	10	22							
S.	20	7 50	7	2	10	2	7	38	10	4	1	32	17	5	2	4	17	9	10	56	11	11	11	28	12	1	11	28							
S.	21	8 43	8	12	10	7	8	44	10	9	2	34	18	2	3	5	18	10	11	57	12	8	—	—	—	—	—	—							
M.	22	9 38	9	14	11	0	9	44	11	3	3	36	19	4	4	4	19	10	0	26	13	0	0	54	13	—	0	54							
Tu.	23	10 34	10	14	11	5	10	42	11	7	4	32	20	4	4	59	20	9	1	24	13	9	1	54	14	—	1	54							
W.	24	11 32	11	8	11	9	11	33	11	11	5	24	21	0	5	49	21	3	2	20	14	3	2	45	14	—	2	45							
Th.	25	0a31	11	58	11	11	—	—	—	—	6	15	21	4	6	40	21	5	3	9	14	8	3	32	14	—	3	32							
F.	26	1 29	0	22	11	11	0	46	11	10	7	5	21	5	7	29	21	4	3	56	14	9	4	19	14	—	4	19							
S.	27	2 24	1	10	11	9	1	32	11	7	7	51	21	2	8	12	20	11	4	40	14	7	5	2	14	—	5	2							
S.	28	3 17	1	54	11	5	2	16	11	3	8	34	20	7	8	56	20	1	5	24	14	0	5	47	13	—	5	47							
M.	29	4 7	2	39	11	1	3	1	10	10	9	19	19	7	9	41	19	1	6	10	13	4	6	34	12	—	6	34							
Tu.	30	4 54	3	23	10	8	3	44	10	6	10	3	18	7	10	26	18	1	6	58	12	7	7	22	12	—	7	22							
W.	31	5 38	4	6	10	3	4	29	10	2	10	52	17	8	11	20	17	3	7	47	11	11	8	12	11	—	8	12							
Half Mean Spring } Range.			5ft. 9in.				10ft. 5in.				7ft. 2in.																								
Phases of the Moon.												Moon's Declination at Noon.																							
												M.D. 0 1 M.D. 0 1 M.D. 0 1 M.D. 0																							
First Quarter 2 4 4 Afternoon.												1 15 N.29 9 12 S.27 17 11 S.6 25 18 N.4																							
Full - - - - 10 8 23 Afternoon.												2 12 42 10 15 13 18 7 7 26 19																							
Last Quarter 18 6 39 Morning.												3 9 26 11 17 21 19 2 39 27 18 1																							
New - - - - 24 10 49 Afternoon.												4 5 50 12 18 40 20 2 N.1 28 16 2																							
												5 2 2 13 19 5 21 6 39 29 13 5																							
In Apogee - 6 4 0 Afternoon.												6 1 S.49 14 18 30 22 10 56 30 10 4																							
In Perigee - 22 0 0 Noon.												7 5 36 15 16 56 23 14 32 31 7																							
												8 9 12 16 14 26 24 17 12																							

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 HARWICH subtract 5 m.      HULL add 1 m.      SUNDERLAND add 5 m.

MAY, 1865.

NORTH SHIELDS.												LEITH.												THURSO.												C'S AGE AT NOON.																																																																																																																																																																																																																																																																																																																																																														
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of Mean Spring } 6ft. 8in.  
Range.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M.	S.		M.D.	M.	S.		M.D.	M.	S.		M.D.	M.	S.	
3	3	Add.	9	3	45	Add.	17	3	51	Add.	25	3	20	Add.
3	10		10	3	48		18	3	49		26	3	14	
3	17		11	3	50		19	3	47		27	3	8	
3	23		12	3	52		20	3	44		28	3	0	
3	28		13	3	53		21	3	40		29	2	53	
3	33		14	3	53		22	3	36		30	2	45	
3	38		15	3	53		23	3	31		31	2	36	
3	42		16	3	52		24	3	26					

ies of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
NORTH SHIELDS add 6 m. LEITH add 13 m. THURSO add 14 m.



MAY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
			H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.	
M.	1	5a27	3 40	9 1		4 6	8 11		2 51	22 9		3 16	21 11		10 4	17 6		10 28	16 18	
Tu.	2	6 15	4 32	8 8		4 59	8 6		3 43	21 2		4 13	20 6		10 52	16 2		11 17	15 13	
W.	3	6 59	5 29	8 4		6 3	8 3		4 47	19 11		5 24	19 9		11 47	15 4		—	—	
Th.	4	7 42	6 39	8 2		7 13	8 1		6 5	19 9		6 42	19 11		0 20	15 3		0 55	15 13	
F.	5	8 25	7 46	8 2		8 19	8 4		7 16	20 3		7 47	20 9		1 32	15 5		2 8	15 13	
S.	6	9 7	8 46	8 5		9 15	8 7		8 14	21 2		8 41	21 9		2 38	16 3		3 10	16 9	
S.	7	9 49	9 41	8 8		10 2	8 10		9 42	22 3		9 23	22 9		3 37	17 4		4 0	17 12	
M.	8	10 33	10 21	8 11		10 41	9 0		9 41	23 3		9 59	23 8		4 22	18 3		4 43	18 8	
Tu.	9	11 18	11 0	9 1		11 20	9 2		10 16	23 11		10 34	24 3		5 3	19 0		5 24	19 8	
W.	10	morn.	11 39	9 3		11 58	9 4		10 52	24 6		11 10	24 8		5 44	19 7		6 2	19 8	
Th.	11	0 5	—	—		0 16	9 4		11 28	24 10		11 45	24 10		6 19	19 11		6 36	20 3	
F.	12	0 55	0 33	9 5		0 51	9 5		—	—		0 32	24 11		6 53	20 2		7 11	20 8	
S.	13	1 46	1 10	9 5		1 28	9 5		0 21	24 11		0 39	24 10		7 29	19 11		7 47	19 9	
S.	14	2 38	1 46	9 5		2 5	9 5		0 57	24 7		1 16	24 4		8 6	19 6		8 27	19 8	
M.	15	3 30	2 26	9 4		2 47	9 3		1 36	24 0		1 57	23 7		8 49	19 0		9 10	18 8	
Tu.	16	4 23	3 8	9 2		3 30	9 1		2 18	23 2		2 40	22 10		9 31	18 3		9 54	18 8	
W.	17	5 15	3 54	9 0		4 22	8 11		3 52	22 6		3 33	22 0		10 19	17 7		10 45	17 8	
Th.	18	6 7	4 51	8 10		5 23	8 9		4 52	21 8		4 39	21 5		11 12	16 11		11 41	16 9	
F.	19	6 58	5 56	8 8		6 30	8 8		5 16	21 4		5 55	21 6		—	—		0 12	16 12	
S.	20	7 50	7 4	8 8		7 38	8 10		6 33	21 11		7 8	22 5		0 46	17 0		1 24	17 4	
S.	21	8 43	8 11	9 0		8 43	9 2		7 40	23 1		8 10	23 8		2 3	17 11		2 37	18 8	
M.	22	9 38	9 14	9 3		9 44	9 5		8 38	24 4		9 52	25 0		3 9	19 2		3 42	19 9	
Tu.	23	10 34	10 13	9 7		10 40	9 8		9 32	25 6		9 57	26 0		4 13	20 4		4 43	20 15	
W.	24	11 32	11 7	9 9		11 33	9 10		10 21	26 8		10 46	26 6		5 11	21 2		5 38	21 8	
Th.	25	0a31	12 0	9 10		—	—		11 11	26 8		11 36	26 8		6 4	21 7		6 28	21 8	
F.	26	1 29	0 25	9 11		0 49	9 11		12 0	26 7		—	—		6 51	21 6		7 13	21 8	
S.	27	2 24	1 12	9 10		1 34	9 9		0 22	26 4		0 44	26 1		7 34	21 0		7 56	20 7	
S.	28	3 17	1 56	9 8		2 17	9 7		1 6	25 7		1 28	25 0		8 19	20 2		8 41	19 8	
M.	29	4 7	2 39	9 5		3 1	9 3		1 49	24 5		2 11	23 9		9 3	19 1		9 23	18 8	
Tu.	30	4 54	3 21	9 2		3 43	9 0		2 32	23 1		2 54	22 6		9 43	18 0		10 4	17 8	
W.	31	5 38	4 6	8 10		4 29	8 9		3 17	21 11		3 40	21 4		10 26	17 0		10 47	16 9	
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.					
Phases of the Moon.										Moon's Declination at Noon.										
D. H. M.										M.D. ° ' "										
First Quarter- 2 4 4 Afternoon.										1 15 N. 29 9 12 S. 27 17 11 S. 6 25 18 N. 45										
Full - - - - 10 8 23 Afternoon.										2 12 42 10 15 13 18 7 7 26 19 5										
Last Quarter - 18 6 39 Morning.										3 9 26 11 17 21 19 2 39 27 18 10										
New - - - - 24 10 49 Afternoon.										4 5 50 12 18 40 20 2 N. 1 28 16 27										
In Apogee - - 6 4 0 Afternoon.										5 2 2 13 19 5 21 6 39 29 13 54										
In Perigee - - 22 0 0 Morning.										6 1 S. 49 14 18 30 22 10 56 30 10 48										
										7 5 36 15 16 56 23 14 32 31 7										
										8 9 12 16 14 26 24 17 12										

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,

GREENOCK add 19 m.

LIVERPOOL add 12 m.

PEMBROKE add 20 m.

MAY, 1865.

ESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age at Noon.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	D.
H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	H. M. P. I.	
32 31 11	10 55 30	9 1 51 14	0 2 18 13	7 2 50 9	8 3 17 9	5 5 9	5 9	3 17 9	5 5 9	3 17 9	5 5 9	5 9
20 29 8	11 49 28	10 2 48 13	2 3 20 12	8 3 46 9	3 4 18 9	0 4 9	0 4	4 18 9	0 4 9	4 18 9	0 4 9	0 4
—	0 23 28	4 3 55 12	6 4 33 12	5 4 53 8	10 5 27 8	9 7 9	9 7	5 27 8	9 7 9	5 27 8	9 7 9	7 9
58 28 2	1 33 28	3 5 12 12	5 5 45 12	6 6 0 8	9 6 32 8	10 8 9	10 8	6 32 8	10 8 9	6 32 8	10 8 9	8 9
8 28 6	2 41 29	1 6 16 12	9 6 45 13	0 7 3 9	0 7 32 9	2 9 9	2 9	7 32 9	2 9 9	7 32 9	2 9 9	9 9
12 29 8	3 44 30	4 7 11 13	3 7 37 13	6 7 59 9	3 8 27 9	5 10 9	5 10	8 27 9	5 10 9	8 27 9	5 10 9	10 9
14 31 1	4 39 31	11 8 0 13	9 8 19 14	1 8 53 9	7 9 15 9	9 11 9	9 11	9 15 9	9 11 9	9 15 9	9 11 9	11 9
2 32 9	5 24 33	5 8 37 14	4 8 54 14	7 9 35 9	11 9 54 10	12 10 9	12 10	9 54 10	12 10 9	9 54 10	12 10 9	12 9
44 34 0	6 5 34 6	9 11 14	3 9 28 15	0 10 10 10	3 10 26 10	4 13 9	4 13	10 26 10	4 13 9	10 26 10	4 13 9	13 9
25 34 11	6 44 35	2 9 46 15	2 10 3 15	3 10 43 10	6 11 0 10	7 0 7	7 0	11 0 10	7 0 7	11 0 10	7 0 7	0 7
3 35 5	7 20 35	7 10 19 15	4 10 34 15	4 11 17 10	7 11 33 10	7 15 9	7 15	11 33 10	7 15 9	11 33 10	7 15 9	15 9
37 35 9	7 55 35	8 10 50 15	4 11 7 15	3 11 50 11	7 11 50 11	16 9	16 9	—	—	—	—	16 9
12 35 7	8 29 35	5 11 24 15	2 11 43 15	1 0 9 10	6 0 28 10	5 17 9	5 17	0 28 10	5 17 9	0 28 10	5 17 9	17 9
47 35 2	9 6 34 10	—	0 4 14 11	0 47 10	4 1 7 10	3 18 9	3 18	1 7 10	3 18 9	1 7 10	3 18 9	18 9
25 34 5	9 45 33 10	0 26 14 9	0 50 14 6	1 29 10 1	1 51 10	0 19 9	0 19	1 51 10	0 19 9	1 51 10	0 19 9	19 9
43 3 3	10 24 32 8	1 14 14 3	1 39 14 0	2 14 9 10	2 39 9	0 20 9	0 20	2 39 9	0 20 9	2 39 9	0 20 9	20 9
47 32 0	11 13 31 5	2 6 13 10	2 37 13 7	3 5 9 7	3 35 9	0 21 9	0 21	3 35 9	0 21 9	3 35 9	0 21 9	21 9
43 30 11	—	3 10 13 5	3 47 13 4	4 9 9 4	4 45 9	3 0 7	3 0	4 45 9	3 0 7	4 45 9	3 0 7	0 7
16 30 8	0 49 30 9	4 25 13 4	5 3 13 6	5 20 9 3	5 53 9	4 23 9	4 23	5 53 9	4 23 9	5 53 9	4 23 9	23 9
24 31 1	1 59 31 8	5 36 13 9	6 8 14 1	6 24 9 6	6 55 9	8 24 9	8 24	6 55 9	8 24 9	6 55 9	8 24 9	24 9
35 32 6	3 11 33 3	6 38 14 5	7 6 14 8	7 25 9 11	7 55 10	12 5 9	12 5	7 55 10	12 5 9	7 55 10	12 5 9	25 9
46 34 2	4 20 35 2	7 34 15 1	8 1 15 5	8 25 10 4	8 57 10	0 26 9	0 26	8 57 10	0 26 9	8 57 10	0 26 9	26 9
54 36 1	5 24 36 10	8 28 15 9	8 52 16 0	9 27 10 8	9 52 10	10 27 9	10 27	9 52 10	10 27 9	9 52 10	10 27 9	27 9
52 37 3	6 20 37 10	9 16 16 3	9 40 16 5	10 15 11 0	10 38 11	2 0 7	2 0	10 38 11	2 0 7	10 38 11	2 0 7	0 7
46 38 0	7 11 38 2	10 4 16 5	10 27 16 5	11 1 11 3	11 25 11	3 0 5	3 0	11 25 11	3 0 5	11 25 11	3 0 5	0 5
34 38 2	7 56 37 10	10 48 16 4	11 8 16 2	11 48 11 2	—	1 5	1 5	—	—	—	—	1 5
17 37 4	8 38 36 10	11 29 15 11	11 53 15 8	0 11 11 0	0 34 10	10 2 5	10 2	0 34 10	10 2 5	0 34 10	10 2 5	2 5
59 36 3	9 19 35 6	—	0 17 15 4	0 57 10 8	1 20 10	5 3 5	5 3	1 20 10	5 3 5	1 20 10	5 3 5	3 5
39 34 8	9 57 33 9	0 41 15 0	1 5 14 7	1 43 10 3	2 6 10	0 4 5	0 4	2 6 10	0 4 5	2 6 10	0 4 5	4 5
15 32 10	10 34 31 11	1 29 14 3	1 53 13 10	2 29 9 10	2 53 9	7 5 5	7 5	2 53 9	7 5 5	2 53 9	7 5 5	5 5
53 31 0	11 15 30 2	2 19 13 7	2 45 13 3	3 18 9 5	3 44 9	3 6 5	3 6	3 44 9	3 6 5	3 44 9	3 6 5	6 5
n Spring } 18ft. 7in.				8ft. 0in.				5ft. 6in.				
ge.												

## Equation of Time at Noon.

L. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
3 3		9	3 45		17	3 51		25	3 20	
3 10		10	3 48		18	3 49		26	3 14	
3 17		11	3 50		19	3 47		27	3 8	
3 23		12	3 52		20	3 44		28	3 0	
3 28		13	3 53		21	3 40		29	2 53	
3 33		14	3 53		22	3 36		30	2 45	
3 38		15	3 53		23	3 31		31	2 36	
3 42		16	3 52		24	3 26				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 ESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.



MAY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.					
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.			
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.		
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.		
M.	1	5 27	2 33	8 9	3 1	8 6	—	—	0 10	6 0	9 23	8 11	9 55	8 8		
Tu.	2	6 15	3 30	8 4	4 0	8 2	0 47	5 9	1 24	5 7	10 29	8 5	11 5	8 3		
W.	3	6 59	4 34	8 1	5 8	8 0	2 7	5 6	2 45	5 6	11 41	8 2	—	—		
Th.	4	7 42	5 42	8 0	6 15	8 0	3 20	5 8	3 50	5 10	0 16	8 2	0 49	8 3		
F.	5	8 25	6 48	8 0	7 19	8 1	4 18	6 0	4 42	6 2	1 21	8 4	1 51	8 7		
S.	6	9 7	7 45	8 2	8 11	8 4	5 2	6 4	5 25	6 5	2 17	8 9	2 43	9 0		
S.	7	9 49	8 34	8 6	8 53	8 8	5 45	6 7	6 3	6 8	3 5	9 3	3 23	9 6		
M.	8	10 33	9 11	8 10	9 29	8 11	6 21	6 10	6 40	7 0	3 40	9 9	3 56	10 0		
Tu.	9	11 18	9 46	9 0	10 4	9 1	6 58	7 1	7 17	7 2	4 13	10 3	4 30	10 5		
W.	10	morn.	10 22	9 2	10 39	9 3	7 36	7 3	7 53	7 3	4 48	10 7	5 7	10 8		
Th.	11	0 5	10 56	9 3	11 12	9 2	8 9	7 4	8 25	7 4	5 25	10 9	5 42	10 9		
F.	12	0 55	11 28	9 2	11 45	9 2	8 40	7 4	8 57	7 3	5 58	10 9	6 15	10 9		
S.	13	1 46	—	—	0 3	9 2	9 13	7 2	9 30	7 1	6 33	10 7	6 51	10 5		
S.	14	2 38	0 22	9 1	0 43	9 1	9 48	6 11	10 8	6 10	7 11	10 2	7 32	10 6		
M.	15	3 30	1 5	9 0	1 29	8 11	10 30	6 8	10 52	6 6	7 53	9 9	8 15	9 6		
Tu.	16	4 23	1 54	8 10	2 20	8 9	11 21	6 4	11 53	6 2	8 40	9 4	9 8	9 2		
W.	17	5 15	2 48	8 8	3 19	8 7	—	—	0 32	6 0	9 42	9 0	10 18	8 14		
Th.	18	6 7	3 52	8 6	4 26	8 5	1 12	5 11	1 55	5 11	10 56	8 10	11 33	8 14		
F.	19	6 58	5 1	8 5	5 34	8 5	2 37	6 0	3 12	6 3	—	—	0 7	9 4		
S.	20	7 50	6 7	8 5	6 40	8 6	3 42	6 6	4 10	6 9	0 40	9 2	1 13	9 4		
S.	21	8 43	7 12	8 7	7 41	8 9	4 35	7 0	4 57	7 1	1 44	9 7	2 13	9 11		
M.	22	9 38	8 8	8 11	8 35	9 2	5 19	7 3	5 45	7 5	2 39	10 2	3 5	10 6		
Tu.	23	10 34	9 3	9 4	9 28	9 6	6 12	7 7	6 39	7 9	3 30	10 10	3 54	11 1		
W.	24	11 32	9 52	9 7	10 16	9 7	7 5	7 10	7 30	7 11	4 18	11 4	4 43	11 6		
Th.	25	0 31	10 40	9 8	11 3	9 7	7 54	8 0	8 17	8 0	5 8	11 7	5 33	11 7		
F.	26	1 29	11 26	9 7	11 46	9 6	8 38	7 11	8 58	7 9	5 56	11 6	6 17	11 4		
S.	27	2 24	—	—	0 9	9 5	9 18	7 7	9 39	7 4	6 38	11 1	7 1	10 14		
S.	28	3 17	0 33	9 4	0 56	9 3	10 0	7 2	10 22	6 11	7 24	10 5	7 46	10 1		
M.	29	4 7	1 19	9 1	1 44	9 0	10 44	6 9	11 8	6 6	8 8	9 9	8 30	9 1		
Tu.	30	4 54	2 9	8 10	2 35	8 8	11 37	6 3	—	—	8 54	9 2	9 22	8 11		
W.	31	5 38	3 1	8 6	3 27	8 4	0 9	6 0	0 42	5 9	9 51	8 8	10 21	8 1		
Half Mean Spring } Range.			4ft. 9in.				3ft. 10in.				5ft. 7in.					
Phases of the Moon.							Moon's Declination at Noon.									
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'	
First Quarter - 2 4 4 Afternoon.							1	15	N. 29	9	12	S. 27	17	11 S. 6	25	18 N. 4
Full - - - - 10 8 23 Afternoon.							2	12	42	10	15	13	18	7 7	26	19
Last Quarter - 18 6 39 Morning.							3	9	26	11	17	21	19	2 39	27	18 1
New - - - - 24 10 49 Afternoon.							4	5	50	12	18	40	20	2 N. 1	28	16 2
							5	2	2	13	19	5	21	6 39	29	13 5
In Apogee - - 6 4 0 Afternoon.							6	1	S. 49	14	18	30	22	10 56	30	10 4
In Perigee - - 22 0 0 Noon.							7	5	36	15	16	56	23	14 32	31	7
							8	9	12	16	14	26	24	17 12		

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required, —  
 BELFAST subtract 3 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 m.

MAY, 1865.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's Age At Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		D.
H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		
8 42	12 0		9 10	11 5		8 55	10 0		9 20	9 8		9 11	11 0		9 34	10 8		5.9
9 39	11 0		10 13	10 9		9 45	9 4		10 13	9 1		10 2	10 4		10 36	10 0		6
10 49	10 8		11 27	10 7		10 48	9 0		11 24	8 11		11 9	9 10		11 42	9 8		7.9
—	—		0 1	10 9		11 59	9 0		—	—		—	—		0 13	9 8		8.9
0 33	10 11		1 3	11 2		0 32	9 1		1 5	9 3		0 44	9 10		1 15	10 0		9.9
1 29	11 6		1 54	11 10		1 35	9 5		2 6	9 8		1 44	10 2		2 15	10 5		10.9
2 17	12 2		2 37	12 5		2 33	9 10		2 54	10 1		2 44	10 8		3 9	10 11		11.9
2 57	12 9		3 16	13 0		3 15	10 4		3 35	10 7		3 31	11 1		3 53	11 4		12.9
3 32	13 3		3 50	13 6		3 54	10 9		4 13	10 11		4 14	11 6		4 35	11 8		13.9
4 8	13 9		4 26	13 11		4 32	11 1		4 50	11 2		4 55	11 9		5 13	11 10		14.9
4 42	14 0		4 59	14 1		5 8	11 3		5 26	11 3		5 30	11 10		5 46	11 11		15.9
5 17	14 1		5 36	14 1		5 44	11 3		6 3	11 3		6 4	11 11		6 23	11 11		16.8
5 54	14 0		6 12	13 10		6 20	11 3		6 38	11 2		6 41	11 11		7 0	11 11		17.9
6 32	13 8		6 54	13 6		6 58	11 0		7 19	10 11		7 19	11 10		7 39	11 9		18.9
7 16	13 3		7 39	13 0		7 40	10 9		8 0	10 7		7 59	11 8		8 19	11 8		19.9
8 4	12 8		8 30	12 4		8 21	10 5		8 44	10 2		8 40	11 4		9 1	11 4		20.9
9 0	12 0		9 31	11 9		9 11	10 0		9 38	9 10		9 25	11 0		9 54	10 10		21.9
10 5	11 8		10 41	11 8		10 7	9 9		10 40	9 8		10 28	10 8		11 2	10 7		22.9
11 18	11 10		11 52	12 1		11 15	9 9		11 50	9 10		11 34	10 6		—	—		23.9
—	—		0 25	12 4		—	—		0 25	10 1		0 5	10 7		0 36	10 10		24.9
0 56	12 9		1 24	13 2		0 59	10 4		1 33	10 7		1 8	11 0		1 41	11 3		25.9
1 51	13 7		2 19	13 11		2 5	10 10		2 36	11 1		2 15	11 7		2 50	11 11		26.9
2 48	14 3		3 14	14 7		3 7	11 4		3 34	11 7		3 23	12 2		3 53	12 4		27.9
3 38	14 10		4 3	15 1		4 1	11 10		4 27	12 0		4 22	12 7		4 49	12 8		28.9
4 27	15 3		4 51	15 3		4 52	12 1		5 17	12 1		5 15	12 8		5 39	12 8		29.9
5 14	15 3		5 37	15 1		5 42	12 0		6 4	11 11		6 2	12 8		6 24	12 7		30.9
5 59	14 10		6 22	14 6		6 26	11 9		6 48	11 7		6 46	12 6		7 9	12 4		31.9
6 45	14 2		7 8	13 9		7 10	11 4		7 32	11 1		7 31	12 2		7 52	12 0		32.9
7 31	13 4		7 54	12 11		7 54	10 9		8 14	10 6		8 13	11 9		8 32	11 6		33.9
8 18	12 5		8 42	12 0		8 34	10 3		8 56	10 0		8 51	11 3		9 12	11 0		34.9
9 7	11 6		9 33	11 3		9 18	9 9		9 40	9 6		9 32	10 9		9 57	10 6		35.9
Mean Spring Range.			7ft. 5in.			5ft. 10in.			6ft. 2in.									

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.
3 3		9	3 45		17	3 51		25	3 20		25	3 20		25
3 10		10	3 48		18	3 49		26	3 14		26	3 14		26
3 17		11	3 50		19	3 47		27	3 8		27	3 8		27
3 23		12	3 52		20	3 44		28	3 0		28	3 0		28
3 28		13	3 53		21	3 40		29	2 53		29	2 53		29
3 33		14	3 53		22	3 36		30	2 45		30	2 45		30
3 38		15	3 53		23	3 31		31	2 36		31	2 36		31
3 42		16	3 52		24	3 26								

es of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 3 m.

## TIDE TABLES FOR THE

JUNE, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTER.																							
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																						
			H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.																						
Th.	1	6a21	8 58 14 0	9 25 13 10	10 26 11 11	10 52 12 3	4 30 10 6	4 54	F.	2	7 3	9 59 13 9	10 32 13 9	11 22 11 8	11 57 11 9	5 21 10 1	5 52	S.	3	7 45	11 4 13 10	11 37 14 0	—	—	0 32 11 11	6 22 9 11	6 53														
S.	4	8 28	—	—	0 8 14 3	1 6 12 5	1 40 12 5	7 24 10 2	7 55	M.	5	9 13	0 36 14 7	1 2 14 11	2 14 12 9	2 42 12 11	8 26 10 7	8 53	Tu.	6	10 0	1 27 15 4	1 49 15 10	3 8 13 3	3 34 13 7	7 9 19 11	0 9 43														
W.	7	10 48	2 10 16 4	2 30 16 9	3 58 13 9	4 22 14 1	10 5 11 5	10 26	Th.	8	11 39	2 51 17 2	3 11 17 6	4 43 14 3	5 4 14 8	10 47 11 9	11 7	F.	9	morn.	3 30 17 9	3 49 17 11	5 24 14 8	5 43 15 1	11 26 11 11	11 45															
S.	10	0 32	4 9 18 1	4 30 18 2	6 2 14 10	6 22 15 4	—	—	0 5	S.	11	1 25	4 47 18 3	5 6 18 3	6 42 14 11	7 0 15 5	0 26 12 2	0 46	M.	12	2 19	5 26 18 3	5 46 18 2	7 18 14 10	7 37 15 4	1 6 12 2	1 27														
Tu.	13	3 12	6 9 18 0	6 32 17 9	7 57 14 7	8 19 15 0	1 48 12 2	2 10	W.	14	4 4	6 56 17 5	7 21 17 0	8 40 14 2	9 2 14 7	2 33 12 0	2 57	Th.	15	4 55	7 48 16 7	8 15 16 2	9 24 13 9	9 50 14 0	3 21 11 9	3 46															
F.	16	5 47	8 43 15 10	9 12 15 8	10 17 13 3	10 47 13 7	4 13 11 5	4 41	S.	17	6 38	9 45 15 6	10 19 15 6	11 19 13 0	11 54 13 4	5 9 11 1	5 39	S.	18	7 31	10 54 15 7	11 31 15 9	—	—	0 32 13 2	6 11 10 11	6 43														
M.	19	8 25	—	—	0 8 16 1	1 11 13 6	1 49 13 7	7 18 11 0	7 56	Tu.	20	9 20	0 39 16 5	1 10 16 10	2 27 13 10	2 59 14 2	8 30 11 6	9 2	W.	21	10 17	1 40 17 4	2 8 17 9	3 30 14 5	3 59 14 9	9 34 12 0	10 3														
Th.	22	11 15	2 35 18 3	3 0 18 7	4 26 14 11	4 53 15 4	10 31 12 4	10 57	F.	23	0a11	3 25 18 9	3 48 18 10	5 19 15 3	5 43 15 8	11 22 12 6	11 44	S.	24	1 5	4 11 18 10	4 33 18 9	6 6 15 3	6 28 15 10	—	—	0 7														
S.	25	1 57	4 52 18 8	5 12 18 6	6 48 15 3	7 6 15 8	0 30 12 6	0 52	M.	26	2 46	5 32 18 3	5 52 17 11	7 24 14 11	7 42 15 4	1 12 12 3	1 33	Tu.	27	3 32	6 12 17 7	6 32 17 3	8 1 14 4	8 19 14 8	1 54 12 1	2 13															
W.	28	4 16	6 51 16 9	7 10 16 3	8 35 13 9	8 50 13 11	2 33 11 9	2 52	Th.	29	4 59	7 31 15 9	7 53 15 3	9 6 13 1	9 25 13 6	3 11 11 5	3 31	F.	30	5 41	8 14 14 9	8 37 14 4	9 45 12 5	10 5 12 6	3 51 11 0	4 11															
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
			D.	H.	M.				M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'																					
First Quarter-			1	8	22	Morning.			1	3	N.20	9	19	S. 6	17	5	N.18	25	1																						
Full - - - -			9	9	41	Morning.			2	0	S.32	10	18	50	18	9	36	26	1																						
Last Quarter -			16	11	53	Morning.			3	4	22	11	17	32	19	13	22	27																							
New - - - -			23	7	57	Morning.			4	8	3	12	15	14	20	16	20	28																							
									5	11	26	13	12	4	21	18	17	29																							
In Apogee - -			3	9	0	Morning.			6	14	24	14	8	13	22	19	6	30																							
In Perigee - -			18	4	0	Afternoon.			7	16	46	15	3	52	23	18	46																								
									8	18	23	16	0	N.43	24	17	21																								

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m.      DEVONPORT add 11 m.      PORTSMOUTH add 4 m.

JUNE, 1865.

DOVER.					SHEERNESS.					LONDON.					C's Age at Noon.
MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			MORNING.		AFTERNOON.			
Time.	Height.	Time.	Height.		Time.	Height.	Time.	Height.		Time.	Height.	Time.	Height.		
H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.		
4 10 15 3	4 32 14 11	5 40 13 8	6 7 13 5	7 9 16 8	7 34 16 5	0	0	0	0	0	0	0	0	0	
4 57 14 7	5 24 14 5	6 36 13 2	7 7 13 0	8 2 16 2	8 34 16 0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
5 52 14 4	6 20 14 6	7 41 13 1	8 14 13 2	9 8 15 11	9 40 15 10	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	
6 50 14 8	7 22 15 0	8 45 13 3	9 15 13 5	10 10 15 11	10 41 16 0	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	
7 51 15 3	8 18 15 7	9 45 13 8	10 12 13 11	11 12 16 1	11 41 16 4	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	
8 42 15 10	9 6 16 2	10 37 14 1	11 1 14 4	— — — —	0 7 16 6	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
9 29 16 6	9 51 16 10	11 23 14 6	11 44 14 9	0 32 16 9	0 52 17 0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	
10 13 17 1	10 35 17 4	— — — —	0 4 15 0	1 12 17 3	1 34 17 6	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	
10 55 17 6	11 17 17 8	0 24 15 2	0 44 15 3	1 54 17 9	2 13 18 0	0	0	0	0	0	0	0	0	0	
11 38 17 10	12 0 17 11	1 3 15 5	1 22 15 6	2 33 18 2	2 53 18 4	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	
— — — —	0 20 18 0	1 41 15 7	2 0 15 7	3 10 18 6	3 30 18 7	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	
0 41 18 1	1 3 18 1	2 18 15 7	2 37 15 7	3 49 18 8	4 8 18 9	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	
1 26 18 1	1 50 18 0	2 56 15 7	3 16 15 6	4 27 18 9	4 48 18 8	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	
2 14 17 10	2 38 17 8	3 39 15 4	4 2 15 2	5 10 18 7	5 34 18 5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	
3 2 17 4	3 28 17 1	4 26 15 0	4 51 14 9	5 57 18 3	6 22 18 0	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	
3 54 16 10	4 21 16 6	5 19 14 7	5 47 14 5	6 48 17 9	7 16 17 7	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
4 47 16 2	5 14 15 11	6 18 14 3	6 50 14 1	7 47 17 5	8 19 17 2	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
5 42 15 10	6 10 15 11	7 25 14 0	8 1 14 1	8 54 17 1	9 30 17 0	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	
6 44 16 1	7 22 16 5	8 35 14 3	9 10 14 5	10 3 17 0	10 36 17 1	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	
7 55 16 9	8 26 17 1	9 44 14 8	10 15 14 11	11 11 17 3	11 43 17 5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	
8 57 17 5	9 26 17 9	10 45 15 2	11 14 15 4	— — — —	0 14 17 8	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	
9 55 18 0	10 23 18 2	11 41 15 7	— — — —	0 42 17 11	1 10 18 8	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	
10 50 18 4	11 16 18 5	0 8 15 9	0 33 15 11	1 37 18 5	2 1 18 8	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	
11 40 18 5	— — — —	0 58 16 0	1 21 16 0	2 27 18 10	2 51 18 11	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	
0 4 18 5	0 26 18 4	1 43 16 0	2 4 15 11	3 12 19 0	3 35 19 0	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
0 48 18 3	1 10 18 1	2 24 15 10	2 43 15 9	3 55 18 11	4 15 18 10	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	
1 32 17 11	1 53 17 8	3 2 15 7	3 22 15 4	4 35 18 8	4 53 18 6	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	
2 13 17 5	2 33 17 1	3 42 15 2	4 2 14 11	5 13 18 4	5 33 18 1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	
2 53 16 9	3 12 16 5	4 21 14 8	4 41 14 4	5 53 17 10	6 12 17 7	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	
3 32 16 0	3 52 15 8	5 1 14 1	5 23 13 10	6 34 17 3	6 56 16 11	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	
Mean Spring } Range.		9ft. 4in.		8ft. 0in.		9ft. 7in.									

Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
2 28		9	1 5		17	0 34		25	2 18	
2 18		10	0 53		18	0 47		26	2 31	
2 9		11	0 41		19	1 0		27	2 43	
1 59		12	0 29		20	1 13		28	2 56	
1 49		13	0 17		21	1 26		29	3 8	
1 38		14	0 4		22	1 39		30	3 20	
1 27		15	0 8	Sub.	23	1 52				
1 16		16	0 21		24	2 5				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m.      SHEERNESS subtract 3 m.      LONDON 0 m.

JUNE, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.				HULL.				SUNDERLAND.								
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.						
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.					
Th.	1	6 21	4 53	10 0	5 18	9 10	11 51	16 10	—	—	8 39	11 5	9 7	11 4					
F.	2	7 3	5 44	9 9	6 13	9 8	0 21	16 6	0 51	16 4	9 38	11 0	10 11	10 11					
S.	3	7 45	6 48	9 8	7 22	9 9	1 21	16 3	1 50	16 3	10 41	10 11	11 11	11 1					
So.	4	8 28	7 53	9 10	8 23	9 11	2 18	16 6	2 46	16 9	11 39	11 3	—	—					
M.	5	9 13	8 52	10 1	9 19	10 2	3 14	17 2	3 41	17 6	0 6	11 6	0 31	11 9					
Tu.	6	10 0	9 45	10 4	10 10	10 6	4 6	17 10	4 30	18 3	0 56	12 0	1 20	12 3					
W.	7	10 48	10 34	10 8	10 55	10 10	4 52	18 6	5 12	18 10	1 44	12 6	2 7	12 8					
Th.	8	11 39	11 16	10 11	11 37	11 1	5 32	19 1	5 53	19 4	2 28	12 11	2 49	13 1					
F.	9	morn.	11 57	11 2	—	—	6 13	19 6	6 33	19 8	3 8	13 3	3 25	13 4					
S.	10	0 32	0 16	11 2	0 34	11 2	6 52	19 10	7 12	20 0	3 44	13 7	4 4	13 5					
So.	11	1 25	0 53	11 3	1 14	11 3	7 33	20 1	7 52	20 2	4 23	13 11	4 41	13 11					
M.	12	2 19	1 33	11 2	1 52	11 2	8 10	20 2	8 30	20 2	5 0	13 10	5 21	13 9					
Tu.	13	3 12	2 13	11 1	2 34	11 0	8 51	20 0	9 15	19 9	5 43	13 7	6 6	13 4					
W.	14	4 4	2 57	10 11	3 21	10 10	9 38	19 6	10 2	19 3	6 30	13 3	6 56	13 1					
Th.	15	4 55	3 44	10 9	4 8	10 8	10 27	19 0	10 55	18 8	7 23	12 11	7 51	12 8					
F.	16	5 47	4 34	10 7	5 1	10 6	11 27	18 5	—	—	8 20	12 6	8 50	12 4					
S.	17	6 38	5 29	10 5	5 58	10 4	0 2	18 2	0 36	17 11	9 21	12 2	9 56	12 1					
So.	18	7 31	6 31	10 4	7 8	10 5	1 9	17 10	1 39	17 10	10 30	12 1	11 2	12 1					
M.	19	8 25	7 43	10 6	8 18	10 7	2 8	18 0	2 40	18 4	11 33	12 4	—	—					
Tu.	20	9 20	8 52	10 9	9 22	10 11	3 13	18 9	3 44	19 2	0 4	12 7	0 34	12 11					
W.	21	10 17	9 53	11 1	10 25	11 2	4 14	19 6	4 43	19 10	1 4	13 2	1 35	13 1					
Th.	22	11 15	10 53	11 4	11 20	11 6	5 10	20 1	5 36	20 4	2 4	13 7	2 32	13 11					
F.	23	0 11	11 46	11 7	—	—	6 2	20 6	6 27	20 7	2 58	13 11	3 21	14 1					
S.	24	1 5	0 11	11 7	0 33	11 7	6 51	20 8	7 14	20 8	3 43	14 2	4 5	14 1					
So.	25	1 57	0 55	11 6	1 17	11 5	7 37	20 7	7 57	20 6	4 27	14 3	4 47	14 1					
M.	26	2 46	1 38	11 4	1 58	11 3	8 17	20 4	8 37	20 2	5 7	14 0	5 27	13 1					
Tu.	27	3 32	2 19	11 1	2 40	10 11	8 57	19 10	9 18	19 5	5 48	13 6	6 9	13 1					
W.	28	4 16	3 0	10 10	3 20	10 8	9 38	19 1	9 57	18 9	6 30	12 11	6 51	12 1					
Th.	29	4 59	3 39	10 6	3 58	10 4	10 16	18 4	10 37	17 11	7 12	12 5	7 33	12 1					
F.	30	5 41	4 17	10 3	4 37	10 1	11 1	17 7	11 26	17 2	7 55	11 10	8 18	11 1					
Half Mean Spring } Range.			5 ft. 9 in.				10 ft. 5 in.				7 ft. 2 in.								
Phases of the Moon.							Moon's Declination at Noon.												
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'				
First Quarter - 1 8 22 Morning.							1	3	N. 20	9	19	S. 6	17	5	N. 18				
Full - - - - 9 9 41 Morning.							2	0	S. 32	10	18	50	18	9	36				
Last Quarter - 16 11 53 Morning.							3	4	22	11	17	32	19	13	22				
New - - - - 23 7 57 Morning.							4	8	3	12	15	14	20	16	20				
In Apogee - - 3 9 0 Morning.							5	11	26	13	12	4	21	18	17				
In Perigee - - 18 4 0 Afternoon.							6	14	24	14	8	13	22	19	6				
							7	16	46	15	3	52	23	18	46				
							8	18	23	16	0	N. 43	24	17	21				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—

HARWICH subtract 5 m.

HULL add 1 m.

SUNDERLAND add 5 m.

JUNE, 1865.

NORTH SHIELDS.				LEITH.				THURSO.				C's Age at Noon.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	
8 47	10 2	9 17	10 0	7 41	13 0	8 11	12 9	1 32	9 11	2 2	9 8	D.
9 51	9 11	10 23	9 11	8 43	12 7	9 17	12 6	2 35	9 6	3 10	9 5	8.5
10 53	9 11	11 23	10 1	9 48	12 7	10 17	12 8	3 45	9 5	4 16	9 6	9.5
11 52	10 3	—	—	10 45	12 10	11 13	13 0	4 46	9 7	5 15	9 8	10.5
0 20	10 5	0 45	10 8	11 38	13 3	—	—	5 40	9 11	6 4	10 2	11.5
1 8	10 10	1 30	11 0	0 2	13 5	0 24	13 9	6 25	10 6	6 45	10 10	12.5
1 51	11 3	2 11	11 6	0 45	14 0	1 6	14 5	7 3	11 3	7 20	11 7	13.5
2 30	11 9	2 49	12 0	1 26	14 9	1 47	15 0	7 37	11 11	7 55	12 3	14.5
3 8	12 2	3 26	12 4	2 6	15 3	2 25	15 5	8 13	12 5	8 31	12 6	15.5
3 45	12 6	4 4	12 7	2 43	15 7	3 1	15 8	8 49	12 7	9 8	12 8	16.5
4 24	12 7	4 43	12 7	3 20	15 8	3 39	15 8	9 28	12 8	9 48	12 7	17.5
5 3	12 7	5 24	12 6	3 58	15 7	4 19	15 6	10 9	12 6	10 31	12 4	18.5
5 46	12 5	6 10	12 4	4 41	15 5	5 4	15 4	10 55	12 2	11 20	11 11	19.5
6 34	12 2	6 58	12 0	5 28	15 2	5 54	14 11	11 46	11 9	—	—	20.5
7 24	11 10	7 54	11 7	6 21	14 8	6 50	14 5	0 12	11 6	0 41	11 3	21.5
8 25	11 4	8 58	11 1	7 19	14 2	7 52	14 0	1 11	11 1	1 43	10 11	22.5
9 32	11 0	10 8	11 0	8 25	13 10	9 0	13 9	2 16	10 9	2 53	10 8	23.5
10 42	11 0	11 14	11 2	9 35	13 9	10 7	13 11	3 31	10 8	4 6	10 8	24.5
11 46	11 4	—	—	10 39	14 0	11 12	14 3	4 40	10 9	5 14	10 11	25.5
0 19	11 7	0 47	11 9	11 41	14 6	—	—	5 43	11 2	6 10	11 6	26.5
1 15	11 11	1 42	12 2	0 8	14 9	0 36	15 1	6 36	11 11	7 0	12 3	27.5
2 9	12 5	2 35	12 8	1 3	15 5	1 31	15 9	7 23	12 8	7 45	12 11	28.5
2 59	12 10	3 22	13 0	1 56	16 0	2 20	16 1	8 8	13 1	8 30	13 2	29.5
3 44	13 1	4 6	13 1	2 42	16 2	3 3	16 2	8 51	13 1	9 12	13 0	30.5
4 28	13 0	4 49	12 10	3 23	16 1	3 44	15 11	9 33	12 11	9 54	12 8	31.5
5 9	12 8	5 30	12 6	4 4	15 8	4 25	15 6	10 15	12 6	10 37	12 2	32.5
5 52	12 3	6 13	12 1	4 47	15 3	5 7	15 0	10 58	11 11	11 20	11 7	33.5
6 33	11 10	6 53	11 7	5 28	14 9	5 48	14 6	11 41	11 4	—	—	34.5
7 13	11 4	7 35	11 1	6 10	14 2	6 32	13 10	0 2	11 0	0 23	10 8	35.5
7 59	10 9	8 24	10 5	6 54	13 6	7 18	13 3	0 46	10 5	1 10	10 2	36.5
Mean Spring Range. } 6ft. 8in.				8ft. 2in.				6ft. 7in.				

## Equation of Time at Noon.

M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
2 28	Add.	9	1 5	Add.	17	0 34	Sub.	25	2 18	Sub.
2 18		10	0 53		18	0 47		26	2 31	
2 9		11	0 41		19	1 0		27	2 43	
1 59		12	0 29		20	1 13		28	2 56	
1 49		13	0 17		21	1 26		29	3 8	
1 38		14	0 4		22	1 39		30	3 20	
1 27	Sub.	15	0 8		23	1 52				
1 16		16	0 21		24	2 5				

ms of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.



JUNE, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.						
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.			
Th.	1	6 21	4 54	8 7	5 19	8 6	4 7 20	10	4 35	20 4	11 9 16	0	11 33 15	1			
F.	2	7 3	5 47	8 4	6 18	8 3	5 7 20	1	5 41	20 0	—	—	0 1 15	2			
S.	3	7 45	6 48	8 2	7 19	8 2	6 15 20	1	6 48	20 3	0 30 15	6	1 2 15	3			
S.	4	8 28	7 49	8 3	8 19	8 5	7 19 20	7	7 48	20 11	1 36 15	8	2 11 16	4			
M.	5	9 13	8 48	8 6	9 15	8 7	8 16 21	4	8 40	21 9	2 41 16	5	3 9 16	5			
Tu.	6	10 0	9 40	8 8	10 4	8 10	9 3 22	3	9 25	22 8	3 36 17	4	4 2 17	6			
W.	7	10 48	10 26	8 11	10 48	9 0	9 46 23	1	10 4	23 6	4 26 18	2	4 50 18	7			
Th.	8	11 39	11 10	9 1	11 31	9 2	10 25 23	10	10 45	24 1	5 14 18	11	5 36 19	8			
F.	9	morn.	11 52	9 3	—	—	11 4 24	4	11 24	24 7	5 56 19	6	6 16 19	9			
S.	10	0 32	0 12	9 3	0 32	9 4	11 44 24	10	—	—	6 36 20	0	6 56 20	10			
S.	11	1 25	0 53	9 5	1 13	9 6	0 4 25	0	0 23	25 1	7 14 20	2	7 33 20	11			
M.	12	2 19	1 32	9 6	1 52	9 6	0 43 25	1	1 3	25 1	7 53 20	1	8 14 20	12			
Tu.	13	3 12	2 13	9 7	2 36	9 6	1 24 24	11	1 45	24 7	8 37 19	11	9 0 19	13			
W.	14	4 4	2 59	9 5	3 21	9 4	2 8 24	4	2 31	24 0	9 23 19	4	9 46 19	14			
Th.	15	4 55	3 44	9 4	4 10	9 3	2 54 23	8	3 21	23 3	10 10 18	8	10 34 18	15			
F.	16	5 47	4 37	9 2	5 5	9 1	3 48 22	10	4 19	22 6	10 59 18	0	11 23 17	16			
S.	17	6 38	5 33	8 11	6 5	8 10	4 49 22	2	5 25	22 0	11 50 17	4	—	17			
S.	18	7 31	6 37	8 9	7 9	8 9	6 1 22	0	6 38	22 3	0 19 17	3	0 51 17	18			
M.	19	8 25	7 43	8 10	8 20	8 11	7 13 22	7	7 48	23 0	1 30 17	6	2 11 17	19			
Tu.	20	9 20	8 52	9 1	9 24	9 2	8 19 23	5	8 48	23 11	2 46 18	3	3 20 18	20			
W.	21	10 17	9 55	9 3	10 24	9 4	9 16 24	4	9 43	24 9	3 53 19	2	4 25 19	21			
Th.	22	11 15	10 52	9 5	11 20	9 6	10 9 25	1	10 34	25 4	4 55 20	0	5 24 20	22			
F.	23	0 11	11 47	9 6	—	—	10 59 25	6	11 23	25 8	5 51 20	6	6 15 20	23			
S.	24	1 5	0 11	9 7	0 34	9 8	11 46 25	8	—	—	6 37 20	9	6 59 20	24			
S.	25	1 57	0 57	9 8	1 18	9 8	0 8 25	8	0 29	25 6	7 19 20	7	7 39 20	25			
M.	26	2 46	1 38	9 7	1 58	9 6	0 49 25	4	1 9	25 1	7 59 20	2	8 20 19	26			
Tu.	27	3 32	2 19	9 6	2 39	9 5	1 30 24	8	1 49	24 2	8 40 19	6	9 0 19	27			
W.	28	4 16	2 58	9 3	3 16	9 2	2 8 23	9	2 27	23 3	9 18 18	8	9 36 18	28			
Th.	29	4 59	3 34	9 1	3 54	8 11	2 46 22	10	3 5	22 4	9 54 17	10	10 13 17	29			
F.	30	5 41	4 14	8 10	4 35	8 9	3 25 21	10	3 46	21 3	10 32 17	0	10 52 16	30			
Half Mean Spring Range.			4 ft. 10 in.				13 ft. 0 in.				10 ft. 6 in.						
Phases of the Moon.						Moon's Declination at Noon.											
D. H. M.						M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter - 1 8 22 Morning.						1	3	N. 20	9	19	S. 6	17	5	N. 18	25	15	N. 3
Full - - - - - 9 9 41 Morning.						2	0	S. 32	10	18	50	18	9	36	26	12	4
Last Quarter - 16 11 53 Morning.						3	4	22	11	17	32	19	13	22	27	8	30
New - - - - - 23 7 57 Morning.						4	8	3	12	15	14	20	16	20	28	4	50
						5	11	26	13	12	4	21	18	17	29	0	57
In Apogee - - 3 9 0 Morning.						6	14	24	14	8	13	22	19	6	30	28	50
In Perigee - - 18 4 0 Afternoon.						7	16	46	15	3	52	23	18	46	31		
						8	18	23	16	0	N. 43	24	17	21			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—

GREENOCK add 19 m.

LIVERPOOL add 12 m.

PEMBROKE add 20 m.

JUNE, 1865.

WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	Time. H. M. F. L.	Height. H. M. F. L.	
11 39 29 5	—	—	3 13 12 11	3 43 12 9	4 12 9 1	4 41 8 11		4 12 9 1	4 41 8 11	8 5		D
0 7 28 11	0 37 28 8	4 16 12 7	4 49 12 7	5 11 8 10	5 41 8 10	6 38 8 11		5 11 8 10	5 41 8 10	9 5		8 5
1 8 28 7	1 39 28 8	5 21 12 7	5 51 12 9	6 10 8 10	6 38 8 11	7 34 9 3		6 10 8 10	6 38 8 11	10 5		9 5
2 11 28 11	2 43 29 5	6 19 12 11	6 47 13 1	7 6 9 1	7 34 9 3	8 27 9 5		7 6 9 1	7 34 9 3	11 5		10 5
3 14 29 11	3 44 30 5	7 12 13 3	7 36 13 6	8 1 9 4	8 27 9 5	9 17 9 9		8 1 9 4	8 27 9 5	12 5		11 5
4 14 31 1	4 41 31 10	7 59 13 9	8 21 14 0	9 11 10 2	9 17 9 9	10 37 10 4		9 11 10 2	9 17 9 9	13 5		12 5
5 7 32 7	5 31 33 3	8 41 14 3	9 0 14 6	10 18 10 2	10 37 10 4	11 13 10 6		10 18 10 2	10 37 10 4	14 5		13 5
5 55 33 10	6 17 34 4	9 20 14 8	9 39 14 11	10 55 10 5	11 13 10 6	12 10 10 11		10 55 10 5	11 13 10 6	15 5		14 5
6 38 34 8	6 58 35 1	9 58 15 1	10 16 15 2	11 33 10 7	12 10 10 11	1 17 10 12		11 33 10 7	12 10 10 11	16 5		15 5
7 19 35 6	7 40 35 10	10 34 15 3	10 52 15 4	—	—	—		11 33 10 7	12 10 10 11	17 5		16 5
7 58 36 0	8 16 36 0	11 9 15 5	11 28 15 4	0 32 10 7	0 53 10 6	1 25 10 5		—	—	18 5		17 5
8 35 36 1	8 55 36 0	11 50 15 4	—	0 36 15 2	1 15 10 5	2 28 10 1		0 32 10 7	0 53 10 6	19 5		18 5
9 16 35 10	9 37 35 5	0 12 15 3	0 36 15 2	1 28 14 9	2 3 10 2	2 28 10 1		1 15 10 5	1 39 10 4	20 5		19 5
9 57 35 0	10 18 34 5	1 2 15 0	1 28 14 9	2 3 10 2	2 28 10 1	3 22 9 11		2 3 10 2	2 28 10 1	21 5		20 5
10 39 33 10	11 23 33 3	1 55 14 7	2 23 14 4	2 54 10 0	3 22 9 11	4 22 9 8		2 54 10 0	3 22 9 11	22 5		21 5
11 27 32 7	11 53 32 1	2 52 14 2	3 24 14 0	3 50 9 9	4 22 9 8	5 29 9 6		3 50 9 9	4 22 9 8	23 5		22 5
—	0 24 31 8	3 57 13 10	4 34 13 9	4 55 9 7	5 29 9 6	6 29 9 7		4 55 9 7	5 29 9 6	24 5		23 5
0 56 31 6	1 29 31 7	5 9 13 10	5 41 14 0	6 0 9 6	6 29 9 7	7 24 9 11		6 0 9 6	6 29 9 7	25 5		24 5
2 53 1 10	2 43 32 3	6 13 14 2	6 45 14 4	7 0 9 9	7 32 9 11	8 35 10 2		7 0 9 9	7 32 9 11	26 5		25 5
3 20 32 10	3 56 33 6	7 15 14 6	7 44 14 9	8 4 10 0	8 35 10 2	9 37 10 5		8 4 10 0	8 35 10 2	27 5		26 5
4 32 34 3	5 6 35 0	8 12 15 0	8 38 15 3	9 7 10 4	9 37 10 5	10 27 10 9		9 7 10 4	9 37 10 5	28 5		27 5
5 36 35 7	6 53 6 1	9 4 15 6	9 29 15 8	10 4 10 7	10 27 10 9	11 12 10 11		10 4 10 7	10 27 10 9	29 5		28 5
6 33 36 5	6 58 36 7	9 53 15 9	10 15 15 10	11 34 10 11	12 10 10 11	1 17 10 12		10 50 10 10	11 12 10 11	30 5		29 5
7 21 36 9	7 43 36 9	10 36 15 10	10 55 15 9	—	—	—		11 34 10 11	12 10 10 11	31 5		30 5
8 33 36 7	8 22 36 5	11 14 15 8	11 34 15 6	—	—	—		—	—	32 5		31 5
8 41 36 1	9 0 35 8	11 56 15 4	—	0 38 10 8	0 59 10 6	1 42 10 2		0 38 10 8	0 59 10 6	33 5		32 5
9 19 35 3	9 37 34 8	0 18 15 2	0 40 14 11	1 21 10 4	1 42 10 2	2 22 9 10		1 21 10 4	1 42 10 2	34 5		33 5
9 53 33 11	10 9 33 3	1 1 14 7	1 22 14 4	2 2 10 0	2 22 9 10	3 4 9 7		2 2 10 0	2 22 9 10	35 5		34 5
10 25 32 6	10 41 31 8	1 43 14 0	2 5 13 9	2 43 9 9	3 4 9 7	4 27 9 3		2 43 9 9	3 4 9 7	36 5		35 5
10 59 30 11	11 19 30 2	2 27 13 6	2 51 13 2	3 26 9 5	4 27 9 3	5 29 9 6		3 26 9 5	4 27 9 3	37 5		36 5
Mean Spring Range. } 18 ft. 7 in.				8 ft. 0 in.				5 ft. 6 in.				

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
2 28		9	1 5		17	0 34		25	2 18	
2 18		10	0 53		18	0 47		26	2 31	
2 9		11	0 41		19	1 0		27	2 43	
1 59		12	0 29		20	1 13		28	2 56	
1 49		13	0 17		21	1 26		29	3 8	
1 38		14	0 4		22	1 39		30	3 20	
1 27		15	0 8	Sub.	23	1 52				
1 16		16	0 21		24	2 5				

s of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WEST-SUPER-MARE add 12 m. | HOLYHEAD add 12 m. | KINGSTOWN subtract 1 m. for Dublin Time.



## TIDE TABLES FOR THE

JUNE, 1865.

WEEK DAY.		MONTH DAY.	MOON'S TRANSIT.		BELFAST.								LONDONDERRY.								SLIGO BAY.																																		
					MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																														
					Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.																												
Th.	1	6a21	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																											
F.	2	7 3	4 52	8 3	4 22	8 2	1 16	5 8	1 51	5 7	10 52	8 5	11 24	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
S.	3	7 45	5 51	8 0	6 21	8 0	3 29	5 10	3 55	6 0	0 25	8 4	0 55	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	4	8 28	6 51	8 0	7 20	8 1	4 20	6 1	4 44	6 3	1 24	8 6	1 53	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
M.	5	9 13	7 46	8 2	8 10	8 4	5 4	6 4	5 24	6 5	2 19	8 10	2 42	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Tu.	6	10 0	8 33	8 6	8 55	8 8	5 44	6 7	6 5	6 8	3 4	9 3	3 25	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
W.	7	10 48	9 16	8 9	9 36	8 11	6 26	6 10	6 46	6 11	3 43	9 9	4 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	8	11 39	9 56	9 0	10 15	9 1	7 8	7 0	7 29	7 1	4 20	10 2	4 42	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
F.	9	morn.	10 33	9 2	10 52	9 2	7 48	7 2	8 6	7 3	5 10	6 5	5 21	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
S.	10	0 32	11 11	9 3	11 30	9 3	8 24	7 4	8 42	7 4	5 41	10 9	6 0	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	11	1 25	11 48	9 3	—	—	8 59	7 4	9 17	7 3	6 17	10 9	6 37	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
M.	12	2 19	0 7	9 3	0 28	9 3	9 36	7 2	9 56	7 1	6 58	10 7	7 19	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Tu.	13	3 12	0 51	9 2	1 15	9 2	10 18	7 0	10 42	6 11	7 42	10 3	8 5	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
W.	14	4 4	1 41	9 1	2 8	9 0	11 6	6 9	11 37	6 7	8 29	9 10	8 55	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	15	4 55	2 36	8 11	3 5	8 10	—	—	0 11	6 5	9 26	9 6	9 58	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
F.	16	5 47	3 34	8 9	4 5	8 8	0 48	6 3	1 27	6 2	10 33	9 3	11 7	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
S.	17	6 38	4 36	8 7	5 10	8 6	2 7	6 2	2 46	6 3	11 42	9 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	18	7 31	5 41	8 6	6 12	8 6	3 19	6 5	3 47	6 7	0 14	9 3	0 46	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
M.	19	8 25	6 45	8 6	7 20	8 7	4 15	6 9	4 42	6 11	1 18	9 5	1 52	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Tu.	20	9 20	7 49	8 8	8 18	8 10	5 5	7 0	5 29	7 1	2 22	9 9	2 49	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
W.	21	10 17	8 46	9 0	9 13	9 2	5 56	7 3	6 23	7 4	3 16	10 3	3 41	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	22	11 15	9 40	9 3	10 5	9 4	6 50	7 5	7 17	7 6	4 10	9 4	4 31	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
F.	23	0a11	10 29	9 5	10 51	9 5	7 43	7 7	8 5	7 8	4 56	11 0	5 20	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
S.	24	1 5	11 13	9 5	11 33	9 4	8 26	7 8	8 45	7 7	5 43	11 2	6 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	25	1 57	11 52	9 3	—	—	9 4	7 6	9 23	7 4	6 23	10 11	6 43	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
M.	26	2 46	0 13	9 3	0 35	9 2	9 42	7 2	10 2	7 0	7 4	10 7	7 25	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Tu.	27	3 32	0 57	9 2	1 19	9 1	10 21	6 11	10 41	6 9	7 45	10 1	8 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
W.	28	4 16	1 41	9 0	2 2	8 11	11 0	6 6	11 24	6 4	8 23	9 6	8 44	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Th.	29	4 59	2 24	8 9	2 47	8 7	11 50	6 2	—	—	9 6	9 1	9 31	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
F.	30	5 41	3 10	8 6	3 33	8 4	0 18	5 11	0 48	5 9	9 57	8 8	10 25	—	—	—	—	—	—	—	—	—	—	—	—	—	—																												
Half Mean Spring Range.					4ft. 9in.								3ft. 10in.								5ft. 7in.																																		
Phases of the Moon.																												Moon's Declination at Noon.																											
D. H. M.																												M.D. ° ' M.D																											

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 3 m. | LONDONDERRY add 4 m. | SLIGO BAY add 9 m.

JUNE, 1865.

WEEK DAY.	MONTH DAY.	GALWAY.				QUEENSTOWN.				WATERFORD.				C's AGE AT NOON.												
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.														
		Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.													
1	10	1	11	0	10	32	10	10	10	4	9	3	10	31	9	2	10	24	10	3	10	53	10	0	8	
2	11	5	10	10	11	37	10	10	11	2	9	1	11	34	9	1	11	23	9	11	11	51	9	10	8.5	
3	—	—	—	—	0	7	10	11	—	—	—	—	0	5	9	2	—	—	—	—	0	19	9	10	9.5	
4	0	36	11	1	1	5	11	4	0	36	9	3	1	7	9	4	0	47	10	0	1	16	10	1	10.5	
5	1	30	11	7	1	53	11	10	1	37	9	6	2	5	9	8	1	46	10	3	2	15	10	5	11.5	
6	2	16	12	1	2	39	12	5	2	32	9	10	2	56	10	1	2	44	10	8	3	11	10	10	12.5	
7	3	1	12	8	3	21	12	11	3	19	10	4	3	41	10	6	3	36	11	1	4	0	11	3	13.5	
8	3	42	13	2	4	2	13	5	4	3	10	8	4	25	10	10	4	24	11	5	4	47	11	7	14.5	
9	4	21	13	7	4	39	13	10	4	45	11	0	5	4	11	2	5	7	11	8	5	27	11	9	15.5	
10	4	58	14	0	5	19	14	2	5	25	11	3	5	46	11	4	5	46	11	10	6	7	12	0	16.5	
11	5	38	14	2	5	58	14	2	6	5	11	4	6	24	11	4	6	26	12	0	6	45	12	1	17.5	
12	6	19	14	2	6	41	14	0	6	45	11	4	7	6	11	3	7	6	12	1	7	27	12	1	18.5	
13	7	4	13	11	7	28	13	9	7	28	11	2	7	51	11	1	7	49	12	1	8	11	12	0	19.5	
14	7	53	13	6	8	19	13	3	8	14	10	11	8	36	10	9	8	32	11	11	8	54	11	9	20.5	
15	8	47	12	11	9	15	12	7	9	1	10	7	9	26	10	5	9	17	11	7	9	41	11	5	21.5	
16	9	45	12	4	10	15	12	2	9	52	10	3	10	18	10	1	10	8	11	3	10	38	11	0	22.5	
17	10	50	12	1	11	24	12	2	10	49	10	0	11	22	10	0	11	11	10	10	11	41	10	9	23.5	
18	11	57	12	3	—	—	—	—	11	55	10	0	—	—	—	—	—	—	—	—	0	10	10	9	24.5	
19	0	30	12	5	1	3	12	8	0	29	10	1	1	7	10	3	0	41	10	10	1	15	11	0	25.5	
20	1	33	12	11	2	1	13	3	1	42	10	5	2	15	10	7	1	50	11	2	2	26	11	5	26.5	
21	2	30	13	6	2	59	13	9	2	47	10	10	3	17	11	0	3	2	11	7	3	35	11	10	27.5	
22	3	26	14	0	3	51	14	3	3	46	11	3	4	14	11	5	4	5	12	0	4	35	12	1	28.5	
23	4	16	14	5	4	38	14	6	4	39	11	6	5	3	11	7	5	2	12	2	5	26	12	3	29.5	
24	5	0	14	7	5	22	14	7	5	27	11	8	5	50	11	7	5	48	12	3	6	10	12	3	30.5	
25	5	44	14	6	6	4	14	4	6	11	11	7	6	31	11	6	6	31	12	3	6	51	12	2	31.5	
26	6	25	14	2	6	46	13	11	6	51	11	4	7	12	11	2	7	12	12	1	7	33	12	0	32.5	
27	7	7	13	7	7	27	13	4	7	31	11	0	7	51	10	9	7	52	11	10	8	10	11	9	33.5	
28	7	47	13	0	8	8	12	8	8	9	10	7	8	26	10	5	8	27	11	7	8	45	11	4	34.5	
29	8	29	12	3	8	51	11	10	8	44	10	2	9	4	9	11	9	2	11	2	9	19	10	11	6	35.5
30	9	13	11	6	9	37	11	2	9	24	9	8	9	44	9	6	9	38	10	9	10	1	10	6	36.5	
Half Mean Spring Range.		7ft. 5in.				5ft. 10in.				6ft. 2in.																

## Equation of Time at Noon.

M. D.	M. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
1	2 28	Add.	9	1 5	Add.	17	0 34	Sub.	25	2 18	Sub.
2	2 18		10	0 53		18	0 47		26	2 31	
3	2 9		11	0 41		19	1 0		27	2 43	
4	1 59		12	0 29		20	1 13		28	2 56	
5	1 49		13	0 17		21	1 26		29	3 8	
6	1 38		14	0 4		22	1 39		30	3 20	
7	1 27		15	0 8	Sub.	23	1 52				
8	1 16		16	0 21		24	2 5				

be times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## TIDE TABLES FOR THE

JULY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.								DEVONPORT.								PORTSMOUTH.																								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.																							
S.	1	H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																							
	1	6a24	9	14	0	9	28	13	9	10	29	12	0	10	53	12	0	4	34	10	6																						
S.	2	7 7	9	59	13	8	10	32	13	7	11	21	11	8	11	54	11	10	5	22	10	1																					
M.	3	7 52	11	6	13	8	11	40	13	10	—	—	—	—	0	31	11	10	6	23	9	11																					
Tu.	4	8 40	—	—	—	—	0	13	14	1	1	7	12	0	1	42	12	3	7	27	10	1																					
W.	5	9 30	0	44	14	5	1	14	14	10	2	17	12	5	2	48	12	10	8	34	10	6																					
Th.	6	10 22	1	40	15	5	2	3	16	0	3	19	13	1	3	47	13	9	9	32	11	0																					
F.	7	11 16	2	25	16	7	2	47	17	2	4	13	13	10	4	37	14	6	10	20	11	6																					
S.	8	morn.	3	9	17	9	3	31	18	2	5	1	14	5	5	24	15	1	11	5	12	0																					
S.	9	0 10	3	52	18	6	4	13	18	9	5	44	14	10	6	6	15	7	11	48	12	4																					
M.	10	1 5	4	34	19	0	4	53	19	2	6	28	15	2	6	50	15	11	0	9	12	6																					
Tu.	11	1 59	5	13	19	3	5	34	19	2	7	9	15	4	7	29	15	11	0	52	12	8																					
W.	12	2 52	5	56	19	1	6	19	18	11	7	50	15	3	8	11	15	8	1	36	12	8																					
Th.	13	3 44	6	42	18	7	7	5	18	2	8	33	14	11	8	54	15	3	2	20	12	7																					
F.	14	4 36	7	30	17	9	7	56	17	1	9	14	14	6	9	38	14	8	3	6	12	4																					
S.	15	5 28	8	22	16	6	8	52	16	0	10	3	14	0	10	29	13	11	3	55	11	10																					
S.	16	6 21	9	20	15	7	9	52	15	4	10	57	13	5	11	27	13	3	4	48	11	4																					
M.	17	7 15	10	30	15	2	11	8	15	1	—	—	—	—	0	1	13	0	5	45	10	10																					
Tu.	18	8 10	11	47	15	2	—	—	—	—	0	42	13	0	1	21	13	1	6	57	10	8																					
W.	19	9 6	0	24	15	5	0	59	15	9	2	0	13	2	2	38	13	6	8	12	11	0																					
Th.	20	10 1	1	32	16	3	2	1	16	9	3	13	13	8	3	45	14	3	9	24	11	5																					
F.	21	10 56	2	28	17	3	2	51	17	9	4	14	14	2	4	41	14	11	10	23	11	11																					
S.	22	11 48	3	14	18	2	3	36	18	5	5	6	14	8	5	29	14	10	11	10	12	2																					
S.	23	0a38	3	56	18	6	4	17	18	7	5	51	14	11	6	12	15	11	11	52	12	5																					
M.	24	1 25	4	36	18	7	4	53	18	7	6	32	15	1	6	50	15	8	0	13	12	5																					
Tu.	25	2 10	5	10	18	5	5	27	18	3	7	7	14	11	7	22	15	4	0	53	12	4																					
W.	26	2 54	5	43	18	1	6	0	17	10	7	38	14	7	7	54	14	10	1	27	12	3																					
Th.	27	3 37	6	18	17	6	6	36	17	1	8	10	14	1	8	25	14	3	2	1	12	0																					
F.	28	4 19	6	54	16	7	7	12	16	0	8	40	13	7	8	53	13	7	2	37	11	9																					
S.	29	5 2	7	32	15	7	7	52	15	1	9	7	13	0	9	26	12	10	3	13	11	4																					
S.	30	5 46	8	12	14	6	8	35	14	0	9	45	12	5	10	4	12	2	3	50	10	10																					
M.	31	6 32	9	1	13	8	9	31	13	4	10	28	11	11	10	56	11	9	4	32	10	4																					
Half Mean Spring Range.			9ft. 6in.								7ft. 9in.								6ft. 4in.																								
Phases of the Moon.																						Moon's Declination at Noon.																					
D. H. M.																						M.D. ° ' "																					
First Quarter - 1 1 40 Morning.																						1 68. 41 9 168. 7 17 15 N. 29 25 6 M.																					
Full - - - - 8 8 27 Afternoon.																						2 10 10 10 13 11 18 17 42 26 2 2																					
Last Quarter - 15 4 26 Afternoon.																						3 13 18 11 9 27 19 18 53 27 18. 2																					
New - - - - 22 6 29 Afternoon.																						4 15 53 12 5 9 20 18 56 28 5 1																					
First Quarter - 30 7 9 Afternoon.																						5 17 49 13 0 33 21 17 56 29 8 4																					
In Apogee - - 1 3 0 Morning.																						6 18 54 14 4 N. 4 22 15 58 30 12																					
In Perigee - - 13 7 0 Afternoon.																						7 19 1 15 8 27 23 13 15 31 14 5																					
In Apogee - - 28 10 0 Afternoon.																						8 18 6 16 12 20 24 9 58																					

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, —  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add 6 m.

JULY, 1865.

JULY DAY.	DOVER.				SHEERNESS.				LONDON.				C's AGE AT NOON.		
	MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.				
	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	D.				
1	4 14 15 3	4 36 14 11	5 46 13 7	6 11 13 5	7 18 16 8	7 40 16 5	8 16 16 5	9 2							
2	4 59 14 7	5 26 14 4	6 39 13 2	7 8 13 0	8 4 16 2	8 36 16 0	9 2								
3	5 54 14 3	6 22 14 4	7 40 13 0	8 15 13 0	9 10 15 11	9 42 15 9	10 2								
4	6 53 14 6	7 26 14 10	8 47 13 2	9 18 13 4	10 14 15 9	10 47 15 11	11 2								
5	7 59 15 2	8 30 15 6	9 50 13 7	10 21 13 9	11 20 16 0	11 50 16 2	12 2								
6	8 55 15 11	9 20 16 4	10 49 14 0	11 13 14 4	—	0 17 16 5	13 2								
7	9 44 16 9	10 8 17 1	11 36 14 7	11 58 14 11	0 42 16 9	1 4 17 1	14 2								
8	10 32 17 6	10 55 17 10	—	0 20 15 2	1 27 17 5	1 49 17 9	0								
9	11 19 18 2	11 42 18 5	0 42 15 5	1 4 15 7	2 10 18 1	2 32 18 5	16 2								
10	—	0 5 18 7	1 25 15 10	1 45 16 0	2 54 18 9	3 14 18 11	17 2								
11	0 27 18 9	0 49 18 11	2 5 16 1	2 24 16 1	3 35 19 1	3 54 19 3	18 2								
12	1 13 18 11	1 36 18 10	2 44 16 2	3 5 16 1	4 14 19 4	4 36 19 4	19 2								
13	2 0 18 9	2 23 18 7	3 26 16 0	3 49 15 11	4 58 19 3	5 19 19 2	20 2								
14	2 47 18 3	3 11 17 11	4 12 15 9	4 35 15 6	5 43 19 0	6 7 18 9	21 2								
15	3 36 17 6	4 2 17 0	5 0 15 2	5 26 14 10	6 33 18 5	6 59 18 1	22 2								
16	4 29 16 7	4 54 16 2	5 54 14 7	6 26 14 4	7 27 17 9	7 56 17 6	23 2								
17	5 21 15 9	5 52 15 7	6 58 14 1	7 32 13 11	8 26 17 2	9 2 16 11	24 2								
18	6 24 15 6	7 0 15 8	8 12 13 10	8 49 13 11	9 39 16 9	10 15 16 8	25 2								
19	7 38 15 11	8 15 16 3	9 25 14 1	10 1 14 4	10 52 16 9	11 29 16 10	26 2								
20	8 47 16 7	9 18 16 11	10 34 14 7	11 6 14 10	—	0 2 17 0	27 2								
21	9 47 17 3	10 13 17 7	11 34 15 0	12 0 15 3	0 35 17 3	1 2 17 7	28 2								
22	10 38 17 10	11 1 18 0	—	0 24 15 6	1 30 17 11	1 53 18 2	29 2								
23	11 24 18 2	11 46 18 3	0 47 15 8	1 10 15 9	2 16 18 5	2 38 18 7	30 2								
24	—	0 7 18 3	1 29 15 10	1 49 15 10	2 59 18 9	3 18 18 10	31 2								
25	0 27 18 3	0 46 18 3	2 7 15 10	2 25 15 9	3 37 18 11	3 54 18 11	1 7								
26	1 4 18 2	1 23 18 0	2 41 15 8	2 57 15 7	4 11 18 10	4 29 18 9	2 7								
27	1 41 17 10	1 59 17 7	3 13 15 5	3 30 15 3	4 46 18 7	5 2 18 5	3 7								
28	2 17 17 4	2 36 17 0	3 48 15 1	4 6 14 10	5 19 18 3	5 36 18 0	4 7								
29	2 55 16 8	3 13 16 3	4 24 14 7	4 43 14 3	5 53 17 9	6 13 17 6	5 7								
30	3 31 15 10	3 50 15 5	5 2 14 0	5 22 13 9	6 33 17 2	6 54 16 10	6 7								
31	4 12 15 0	4 35 14 7	5 44 13 5	6 9 13 2	7 14 16 6	7 37 16 3	8 7								
Mean Spring Tide.				9ft. 4in.				8ft. 0in.				9ft. 7in.			

## Equation of Time at Noon.

M.	S.	Sub.	M. D.	M.	S.	Sub.	M. D.	M.	S.	Sub.	M. D.	M.	S.	Sub.
3	31	Sub.	9	4	53	Sub.	17	5	49	Sub.	25	6	13	Sub.
3	43		10	5	2		18	5	54		26	6	13	
3	54		11	5	10		19	5	58		27	6	13	
4	5		12	5	18		20	6	2		28	6	12	
4	15		13	5	25		21	6	5		29	6	10	
4	25		14	5	32		22	6	8		30	6	8	
4	35		15	5	38		23	6	10		31	6	6	
4	44		16	5	44		24	6	12					

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.

## TIDE TABLES FOR THE

JULY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.								
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.					
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.				
S.	1	6a24	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.				
S.	1	6a24	4 59 9 11	5 23 9 10	11 54 16 10	—	—	8 43 11 5	9 10 11	—	—	—	—	—	—	—	—	—	—				
M.	2	7 7	5 47 9 9	6 14 9 8	0 23 16 6	0 52 16 4	9 39 11 0	10 11 10 1	—	—	—	—	—	—	—	—	—	—	—				
Tu.	3	7 52	6 47 9 8	7 23 9 8	1 22 16 2	1 51 16 2	10 43 10 11	11 13 10 1	—	—	—	—	—	—	—	—	—	—	—				
W.	4	8 40	7 55 9 9	8 26 9 10	2 19 16 3	2 48 16 7	11 42 11 1	—	—	—	—	—	—	—	—	—	—	—	—				
Th.	5	9 30	8 57 10 0	9 28 10 2	3 18 17 0	3 49 17 5	0 11 11 4	0 40 11 1	—	—	—	—	—	—	—	—	—	—	—				
F.	6	10 22	9 57 10 4	10 24 10 6	4 18 17 10	4 43 18 3	1 8 11 11	1 33 12 3	—	—	—	—	—	—	—	—	—	—	—				
S.	7	11 16	10 47 10 8	11 10 10 11	5 5 18 8	5 26 19 0	1 57 12 6	2 21 12 10	—	—	—	—	—	—	—	—	—	—	—				
S.	8	morn.	11 33 11 1	11 55 11 3	5 48 19 5	6 11 19 9	2 45 13 2	3 7 13 5	—	—	—	—	—	—	—	—	—	—	—				
M.	9	0 10	—	0 17 11 4	6 33 20 0	6 55 20 4	3 27 13 8	3 47 14 0	—	—	—	—	—	—	—	—	—	—	—				
Tu.	10	1 5	0 38 11 5	0 58 11 6	7 17 20 7	7 38 20 9	4 8 14 2	4 28 14 4	—	—	—	—	—	—	—	—	—	—	—				
W.	11	1 59	1 19 11 6	1 39 11 6	7 58 20 11	8 18 21 0	4 47 14 6	5 7 14 0	—	—	—	—	—	—	—	—	—	—	—				
Th.	12	2 52	1 59 11 6	2 21 11 5	8 40 21 0	9 12 21 10	5 29 14 4	5 52 14 4	—	—	—	—	—	—	—	—	—	—	—				
F.	13	3 44	2 44 11 5	3 7 11 4	9 24 20 7	9 48 20 4	6 16 14 0	6 40 13 10	—	—	—	—	—	—	—	—	—	—	—				
Th.	14	4 36	3 29 11 2	3 52 11 1	10 11 20 0	10 36 19 7	7 5 13 7	7 32 13 4	—	—	—	—	—	—	—	—	—	—	—				
S.	15	5 28	4 16 10 11	4 41 10 9	11 2 19 2	11 34 18 8	7 59 13 0	8 27 12 8	—	—	—	—	—	—	—	—	—	—	—				
M.	16	6 21	5 8 10 7	5 38 10 5	—	0 9 18 3	8 58 12 5	9 29 12 0	—	—	—	—	—	—	—	—	—	—	—				
Tu.	17	7 15	6 7 10 4	6 38 10 3	0 43 17 11	1 16 17 8	10 3 12 0	10 40 11 10	—	—	—	—	—	—	—	—	—	—	—				
W.	18	8 10	7 18 10 3	7 57 10 3	1 49 17 6	2 22 17 7	11 15 11 10	11 48 12 0	—	—	—	—	—	—	—	—	—	—	—				
Th.	19	9 6	8 33 10 4	9 8 10 6	2 55 17 10	3 29 18 3	—	0 20 12 4	—	—	—	—	—	—	—	—	—	—	—				
F.	20	10 1	9 42 10 8	10 15 10 10	4 3 18 7	4 35 19 0	0 53 12 6	1 25 12 9	—	—	—	—	—	—	—	—	—	—	—				
S.	21	10 56	10 45 11 0	11 12 11 2	5 3 19 4	5 29 19 8	1 56 13 0	2 24 13 0	—	—	—	—	—	—	—	—	—	—	—				
S.	22	11 48	11 37 11 3	12 0 11 4	5 53 19 11	6 17 20 1	2 49 13 6	3 12 13 8	—	—	—	—	—	—	—	—	—	—	—				
M.	23	on38	—	0 22 11 5	6 40 20 3	7 0 20 5	3 32 13 10	3 52 14 0	—	—	—	—	—	—	—	—	—	—	—				
Tu.	24	1 25	0 41 11 5	1 1 11 5	7 20 20 5	7 40 20 5	4 11 14 1	4 30 14 0	—	—	—	—	—	—	—	—	—	—	—				
W.	25	2 10	1 21 11 4	1 39 11 3	7 58 20 5	8 15 20 4	4 48 14 1	5 4 14 0	—	—	—	—	—	—	—	—	—	—	—				
Th.	26	2 54	1 56 11 2	2 13 11 1	8 31 20 2	8 48 20 0	5 21 13 10	5 39 13 0	—	—	—	—	—	—	—	—	—	—	—				
F.	27	3 37	2 31 11 0	2 48 10 11	9 6 19 8	9 24 19 4	5 57 13 4	6 15 13 0	—	—	—	—	—	—	—	—	—	—	—				
S.	28	4 19	3 6 10 9	3 24 10 8	9 42 19 0	10 0 18 7	6 34 12 10	6 54 12 0	—	—	—	—	—	—	—	—	—	—	—				
S.	29	5 2	3 42 10 6	4 0 10 4	10 18 18 2	10 38 17 9	7 14 12 4	7 34 12 0	—	—	—	—	—	—	—	—	—	—	—				
M.	30	5 46	4 18 10 2	4 36 10 0	11 0 17 4	11 24 16 11	7 54 11 9	8 16 11 5	—	—	—	—	—	—	—	—	—	—	—				
M.	31	6 32	4 57 9 10	5 21 9 8	11 52 16 6	—	8 41 11 2	9 9 10 10	—	—	—	—	—	—	—	—	—	—	—				
Half Mean Spring Range.			5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.								
Phases of the Moon.												Moon's Declination at Noon.											
D. H. M.												M. D. ° ' "											
First Quarter.. 1 1 40 Morning.												1 6 s. 41 9 16 s. 7 17 15 N. 29 25 6 N. 18											
Full - - 8 8 27 Afternoon.												2 10 10 10 13 11 18 17 42 26 2 27											
Last Quarter - 15 4 26 Afternoon.												3 13 18 11 9 27 19 18 53 27 18.26											
New - - - 22 6 29 Afternoon.												4 15 53 12 5 9 20 18 56 28 5 14											
First Quarter - 30 7 9 Afternoon.												5 17 49 13 0 33 21 17 56 29 8 49											
In Apogee - 1 3 0 Morning.												6 18 54 14 4 N. 4 22 15 58 30 13 3											
In Perigee - 13 7 0 Afternoon.												7 19 1 15 8 27 23 13 15 31 14 50											
In Apogee - 28 10 0 Afternoon.												8 18 6 16 12 20 24 9 58											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, —

HARWICH subtract 5 m.

HULL add 1 m.

SUNDERLAND add 5 m.

JULY, 1865.

NORTH SHIELDS.						LEITH.						THURSO.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		
8 51	10 2		9 20	10 0		7 46	13 0		8 14	12 9		1 36	9 11		2 5	9 8		
9 51	9 11		10 23	9 10		8 43	12 7		9 16	12 5		2 35	9 6		3 9	9 5	9.2	
0 55	9 11		11 25	10 0		9 50	12 6		10 19	12 7		3 46	9 4		4 17	9 4	10.2	
1 55	10 2		—	—		10 48	12 8		11 17	12 11		4 49	9 5		5 19	9 6	11.2	
0 24	10 4		0 53	10 6		11 47	13 1		—	—		5 49	9 9		6 16	10 1	12.2	
1 20	10 9		1 42	11 0		0 14	13 5		0 36	13 9		6 37	10 6		6 57	11 0	13.2	
2 4	11 4		2 25	11 8		0 58	14 2		1 20	14 7		7 16	11 6		7 35	11 11	14.2	
2 47	12 0		3 7	12 4		1 42	15 0		2 4	15 4		7 54	12 4		8 14	12 8	15.2	
3 28	12 7		3 48	12 10		2 26	15 8		2 46	15 11		8 34	12 11		8 54	13 1	16.2	
4 9	13 0		4 29	13 2		3 6	16 1		3 25	16 3		9 14	13 2		9 34	13 3	17.2	
4 49	13 2		5 10	13 2		3 45	16 3		4 6	16 3		9 55	13 3		10 18	13 3	18.2	
5 33	13 1		5 56	13 0		4 28	16 2		4 51	16 1		10 41	13 0		11 5	12 10	19.2	
6 20	12 11		6 43	12 9		5 14	15 11		5 37	15 9		11 29	12 7		11 55	12 4	20.2	
7 7	12 6		7 33	12 3		6 3	15 6		6 30	15 2		—	—		0 21	12 0	21.2	
8 1	11 11		8 32	11 6		6 57	14 9		7 26	14 5		0 49	11 7		1 18	11 3	22.2	
9 5	11 2		9 39	11 0		8 1	14 1		8 33	13 10		1 51	11 0		2 24	10 9	23.2	
0 16	10 10		10 52	10 10		9 8	13 7		9 47	13 6		3 0	10 7		3 42	10 5	24.2	
1 27	10 11		—	—		10 21	13 6		10 55	13 7		4 20	10 4		4 56	10 4	25.2	
0 2	11 0		0 34	11 2		11 27	13 10		12 0	14 0		5 29	10 5		6 1	10 9	26.2	
1 5	11 4		1 35	11 7		—	—		0 29	14 4		6 30	11 1		6 55	11 6	27.2	
2 2	11 10		2 28	12 1		0 56	14 8		1 23	15 1		7 19	11 11		7 39	12 4	28.2	
2 51	12 4		3 12	12 7		1 47	15 5		2 9	15 8		7 59	12 8		8 19	12 10	29.2	
3 33	12 9		3 52	12 11		2 32	15 10		2 50	16 0		8 38	12 11		8 56	12 11	30.2	
4 12	12 11		4 31	12 11		3 8	16 0		3 26	15 11		9 15	12 11		9 34	12 10	31.2	
4 50	12 10		5 7	12 8		3 45	15 10		4 2	15 8		9 52	12 8		10 10	12 6	32.2	
5 25	12 6		5 43	12 4		4 19	15 6		4 38	15 4		10 28	12 4		10 45	12 1	33.2	
5 1	12 2		6 19	12 0		4 55	15 2		5 13	15 0		11 4	11 10		11 24	11 6	34.2	
5 37	11 10		6 56	11 6		5 32	14 9		5 52	14 5		11 44	11 2		—	—	35.2	
7 15	11 3		7 36	11 0		6 12	14 1		6 33	13 9		0 4	10 11		0 24	10 7	36.2	
7 58	10 8		8 22	10 3		6 53	13 6		7 16	13 0		0 45	10 3		1 8	9 11	37.2	
8 49	9 11		9 19	9 9		7 44	12 9		8 13	12 6		1 34	9 8		2 4	9 5	38.2	
Mean Spring Tide.						8ft. 2in.						6ft. 7in.						

## Equation of Time at Noon.

L. S.		M. D.	M. S.		M. D.	M. S.		M. D.	M. S.	
3 31	Sub.	9	4 53	Sub.	17	5 49	Sub.	25	6 13	Sub.
3 43		10	5 2		18	5 54		26	6 13	
3 54		11	5 10		19	5 58		27	6 13	
4 5		12	5 18		20	6 2		28	6 12	
4 15		13	5 25		21	6 5		29	6 10	
4 25		14	5 32		22	6 8		30	6 8	
4 35		15	5 38		23	6 10		31	6 6	
4 44		16	5 44		24	6 12				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.



JULY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.				LIVERPOOL.				PEMBROKE.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
S.	1	6 24	4 58	8 7	5 22	8 6	4 11	20 10	4 38	20 4	11 12	16 0	11 35		
S.	2	7 7	5 48	8 4	6 18	8 3	5 7	20 1	5 40	19 11	—	—	—	0 2	
M.	3	7 52	6 49	8 2	7 20	8 2	6 16	19 11	6 50	20 1	0 31	15 4	1 3	1 3	
Tu.	4	8 40	7 52	8 3	8 24	8 4	7 22	20 4	7 54	20 8	1 39	15 6	2 15	2 15	
W.	5	9 30	8 56	8 5	9 27	8 7	8 25	21 2	8 52	21 8	2 49	16 3	3 22	3 22	
Th.	6	10 22	9 53	8 8	10 18	8 10	9 16	22 3	9 38	22 10	3 50	17 4	4 17	4 17	
F.	7	11 16	10 42	8 11	11 5	9 1	10 0	23 5	10 21	23 10	4 43	18 5	5 8	5 8	
S.	8	morn.	11 29	9 2	11 52	9 4	10 43	24 4	11 5	24 9	5 33	19 5	5 57	5 57	
S.	9	0 10	—	—	0 15	9 6	11 27	25 3	11 48	25 7	6 19	20 4	6 40	6 40	
M.	10	1 5	0 37	9 7	0 58	9 8	—	—	0 9	25 10	7 12	20 11	7 21	7 21	
Tu.	11	1 59	1 19	9 9	1 39	9 10	0 29	26 1	0 50	26 3	7 40	21 2	8 1	8 1	
W.	12	2 52	2 1	9 10	2 23	9 10	1 12	26 2	1 34	25 11	8 24	21 0	8 47	8 47	
Th.	13	3 44	2 46	9 10	3 8	9 9	1 56	25 8	2 18	25 4	9 9	20 6	9 31	9 31	
F.	14	4 36	3 30	9 8	3 53	9 7	2 40	24 11	3 3	24 5	9 54	19 9	10 17	10 17	
S.	15	5 28	4 18	9 5	4 44	9 3	3 29	23 10	3 55	23 8	10 41	18 8	11 6	11 6	
S.	16	6 21	5 12	9 1	5 40	8 11	4 26	22 8	4 58	22 1	11 30	17 7	11 56	11 56	
M.	17	7 15	6 11	8 9	6 47	8 8	5 32	21 10	6 12	21 8	—	—	0 29	0 29	
Tu.	18	8 10	7 23	8 7	7 59	8 8	6 52	21 8	7 29	21 10	1 5	16 9	1 47	1 47	
W.	19	9 6	8 36	8 9	9 12	8 10	8 4	22 3	8 37	22 8	2 27	17 2	3 6	3 6	
Th.	20	10 1	9 45	9 0	10 16	9 1	9 8	23 2	9 36	23 8	3 41	18 2	4 15	4 15	
F.	21	10 56	10 44	9 2	11 10	9 3	10 2	24 2	10 26	24 6	4 46	19 2	5 14	5 14	
S.	22	11 48	11 35	9 4	11 59	9 5	10 49	24 10	11 11	25 1	5 40	19 11	6 3	6 3	
S.	23	0 38	—	—	0 20	9 6	11 32	25 4	11 52	25 5	6 23	20 4	6 43	6 43	
M.	24	1 25	0 40	9 7	1 0	9 7	—	—	0 11	25 5	7 2	20 6	7 20	7 20	
Tu.	25	2 10	1 19	9 7	1 36	9 7	0 30	25 5	0 47	25 4	7 37	20 4	7 54	7 54	
W.	26	2 54	1 53	9 7	2 10	9 6	1 4	25 2	1 21	24 10	8 11	19 11	8 28	8 28	
Th.	27	3 37	2 27	9 5	2 44	9 4	1 37	24 6	1 54	24 1	8 46	19 5	9 4	9 4	
F.	28	4 19	3 2	9 3	3 19	9 1	2 12	23 7	2 30	23 1	9 21	18 7	9 38	9 38	
S.	29	5 2	3 37	9 0	3 55	8 11	2 48	22 8	3 6	22 1	9 55	17 8	10 12	10 12	
S.	30	5 46	4 14	8 9	5 33	8 8	3 25	21 7	3 44	20 11	10 30	16 8	10 50	10 50	
M.	31	6 32	5 56	8 6	6 22	8 4	4 8	20 5	4 37	19 11	11 11	15 7	11 37	11 37	
Half Mean Spring Range.			4ft. 10in.				13ft. 0in.				10ft. 6in.				
Phases of the Moon.							Moon's Declination at Noon.								
			D.	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter	1	1	40	Morning.		1	6	8	41	9	16	8	17	15	N. 29
Full	8	8	27	Afternoon.		2	10	10	10	13	11	18	17	42	26
Last Quarter	15	4	26	Afternoon.		3	13	18	11	9	27	19	18	53	27
New	22	6	29	Afternoon.		4	15	53	12	5	9	20	18	56	28
First Quarter	30	7	9	Afternoon.		5	17	49	13	0	33	21	17	56	29
						6	18	54	14	4	N. 4	22	15	58	30
In Apogee	1	3	0	Morning.		7	19	1	15	8	27	23	13	58	31
In Perigee	13	7	0	Afternoon.		8	18	6	16	12	20	24	9	58	32
In Apogee	28	10	0	Afternoon.											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

JULY, 1865.

WEEK DAY.	MONTH DAY.	WESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
		H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.	
S.	1	11 42 29	6	—	—	3 17 12	11	3 46 12	9	4 16 9	1	4 44 8	11	)
M.	2	0 8 28	11	0 38 28	6	4 16 12	7	4 49 12	6	5 12 8	10	5 42 8	9	9.2
Tu.	3	1 9 28	5	1 41 28	5	5 23 12	6	5 53 12	7	6 12 8	10	6 40 8	11	10.2
W.	4	2 14 28	7	2 48 29	1	6 22 12	9	6 51 12	11	7 9 9	0	7 38 9	2	11.2
Th.	5	3 23 29	7	3 58 30	3	7 20 13	2	7 48 13	5	8 9 9	3	8 39 9	5	12.2
F.	6	4 28 31	1	4 57 32	1	8 12 13	9	8 34 14	1	9 6 9	7	9 31 9	10	13.2
S.	7	5 24 33	0	5 49 33	10	8 55 14	5	9 16 14	9	9 54 10	0	10 16 10	2	14.2
M.	8	6 14 34	8	6 38 35	4	9 38 15	0	9 59 15	4	10 36 10	5	10 56 10	7	15.2
Tu.	9	7 13 36	0	7 23 36	7	10 19 15	7	10 39 15	9	11 16 10	9	11 37 10	10	16.2
W.	10	7 44 37	1	8 3 37	5	10 57 15	11	11 15 16	0	11 57 11	0	—	—	17.2
Th.	11	8 23 37	7	8 44 37	8	11 35 16	1	11 58 16	0	0 18 10	11	0 39 10	11	18.2
F.	12	9 5 37	7	9 26 37	4	—	—	0 22 15	11	1 2 10	10	1 25 10	9	19.2
S.	13	9 46 36	11	10 6 36	4	0 46 15	9	1 11 15	7	1 48 10	8	2 12 10	7	20.2
M.	14	10 26 35	7	10 46 34	8	1 37 15	4	2 3 15	0	2 37 10	5	3 3 10	3	21.2
Tu.	15	11 8 33	9	11 33 32	10	2 30 14	8	2 59 14	4	3 29 10	1	3 57 9	11	22.2
W.	16	12 0 32	0	—	—	3 32 14	1	4 5 13	10	4 30 9	8	5 3 9	6	23.2
Th.	17	0 31 31	4	1 6 30	11	4 41 13	8	5 20 13	7	5 36 9	5	6 10 9	4	24.2
F.	18	1 43 30	9	2 21 30	10	5 55 13	7	6 29 13	9	6 43 9	5	7 16 9	6	25.2
S.	19	3 0 31	3	3 41 31	10	7 1 13	11	7 33 14	1	7 49 9	8	8 23 9	9	26.2
M.	20	4 19 32	6	4 55 33	4	8 4 14	4	8 32 14	8	8 57 9	11	9 29 10	10	27.2
Tu.	21	5 27 34	2	5 55 34	10	8 57 14	11	9 20 15	2	9 57 10	3	10 20 10	5	28.2
W.	22	6 21 35	5	6 45 35	9	9 43 15	4	10 5 15	6	10 40 10	7	11 1 10	8	29.2
Th.	23	7 7 36	1	7 27 36	4	10 23 15	7	10 41 15	8	11 20 10	9	11 39 10	9	30.2
F.	24	7 46 36	6	8 4 36	5	10 58 15	8	11 15 15	7	11 59 10	9	—	—	1.7
S.	25	8 20 36	4	8 36 36	2	11 32 15	6	11 50 15	5	0 18 10	8	0 36 10	7	2.7
M.	26	8 52 35	10	9 8 35	6	—	—	0 9 15	3	0 53 10	6	1 11 10	5	3.7
Tu.	27	9 24 35	1	9 40 34	5	0 27 15	1	0 46 14	10	1 29 10	3	1 48 10	2	4.7
W.	28	9 56 33	9	10 11 33	0	1 6 14	6	1 26 14	3	2 6 10	0	2 25 9	10	5.7
Th.	29	10 25 32	2	10 40 31	4	1 46 13	11	2 6 13	7	2 45 9	8	3 5 9	6	6.7
F.	30	10 57 30	6	11 17 29	7	2 26 13	4	2 49 13	0	3 25 9	4	3 47 9	2	7.7
S.	31	11 42 28	10	—	—	3 15 12	9	3 45 12	5	4 14 9	0	4 43 8	10	8.7
Half Mean Spring } 18ft. 7in.														
Range. }														
8ft. 0in.														
5ft. 6in.														

Half Mean Spring } 18ft. 7in.  
Range.

8ft. 0in.

5ft. 6in.

## Equation of Time at Noon.

M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
1	3 31	Sub.	9	4 53	Sub.	17	5 49	Sub.	25	6 13	Sub.
2	3 43		10	5 2		18	5 54		26	6 13	
3	3 54		11	5 10		19	5 58		27	6 13	
4	4 5		12	5 18		20	6 2		28	6 12	
5	4 15		13	5 25		21	6 5		29	6 10	
6	4 25		14	5 32		22	6 8		30	6 8	
7	4 35		15	5 38		23	6 10		31	6 6	
8	4 44		16	5 44		24	6 12				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.



JULY, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
S.	1	6a 24	3 58	8 3	4 25	8 2	1 20	5 8	1 54	5 7	10 55	8 5	11 25	8	
S.	2	7 7	4 53	8 1	5 23	8 0	2 28	5 7	3 0	5 7	11 56	8 3	--	--	
M.	3	7 52	5 53	8 0	6 23	8 0	3 31	5 9	3 58	5 11	0 27	8 3	0 57	8	
Tu.	4	8 40	6 54	8 0	7 25	8 1	4 24	6 0	4 48	6 2	1 27	8 5	1 57	8	
W.	5	9 30	7 55	8 2	8 22	8 4	5 12	6 3	5 35	6 5	2 27	8 9	2 54	9	
Th.	6	10 22	8 45	8 6	9 8	8 8	5 56	6 7	6 18	6 9	3 16	9 3	3 37	9	
F.	7	11 16	9 30	8 10	9 52	9 0	6 41	6 11	7 4	7 0	3 57	9 11	4 18	10	
S.	8	morn.	10 14	9 2	10 35	9 3	7 27	7 2	7 49	7 4	4 40	10 5	5 2	10	
S.	9	0 10	10 55	9 4	11 16	9 4	8 9	7 6	8 29	7 7	5 24	10 11	5 45	11	
M.	10	1 5	11 35	9 5	11 54	9 5	8 47	7 8	9 5	7 8	6 5	11 2	6 24	11	
Tu.	11	1 59	--	--	0 14	9 5	9 24	7 8	9 45	7 7	6 44	11 2	7 6	11	
W.	12	2 52	0 37	9 5	1 1	9 5	10 6	7 6	10 28	7 5	7 29	10 11	7 52	10	
Th.	13	3 44	1 25	9 5	1 50	9 4	10 51	7 3	11 16	7 1	8 15	10 6	8 38	10	
F.	14	4 36	2 17	9 3	2 44	9 1	11 46	6 11	--	--	9 4	10 0	9 33	9	
S.	15	5 28	3 12	8 11	3 41	8 10	0 18	6 7	0 55	6 4	10 5	9 6	10 39	9	
S.	16	6 21	4 12	8 8	4 44	8 7	1 35	6 3	2 14	6 2	11 14	9 2	11 49	9	
M.	17	7 15	5 16	8 6	5 50	8 5	2 53	6 2	3 29	6 3	--	--	0 24	9	
Tu.	18	8 10	6 25	8 4	7 1	8 4	4 0	6 5	4 29	6 7	0 59	9 0	1 34	9	
W.	19	9 6	7 35	8 5	8 8	8 7	4 56	6 8	5 23	6 9	2 8	9 3	2 40	9	
Th.	20	10 1	8 38	8 9	9 6	8 11	5 49	6 10	6 16	7 0	3 9	9 8	3 35	9	
F.	21	10 56	9 32	9 0	9 56	9 2	6 43	7 2	7 8	7 3	3 59	10 3	4 22	10	
S.	22	11 48	10 19	9 3	10 40	9 4	7 32	7 4	7 55	7 5	4 45	10 8	5 8	10	
S.	23	0a 38	10 59	9 4	11 18	9 4	8 13	7 6	8 31	7 7	5 29	11 0	5 48	11	
M.	24	1 25	11 36	9 4	11 53	9 3	8 48	7 6	9 5	7 5	6 6	11 0	6 23	10	
Tu.	25	2 10	--	--	0 11	9 3	9 21	7 4	9 37	7 3	6 41	10 10	6 58	10	
W.	26	2 54	0 29	9 3	0 47	9 2	9 53	7 1	10 9	7 0	7 16	10 5	7 33	10	
Th.	27	3 37	1 5	9 1	1 24	9 0	10 27	6 10	10 45	6 8	7 51	10 0	8 8	9	
F.	28	4 19	1 45	8 11	2 6	8 10	11 4	6 6	11 26	6 4	8 26	9 6	8 46	9	
S.	29	5 2	2 26	8 8	2 47	8 7	11 51	6 1	--	--	9 7	9 0	9 31	8	
S.	30	5 46	3 9	8 5	3 31	8 3	0 17	5 10	0 46	5 7	9 56	8 6	10 23	8	
M.	31	6 32	3 56	8 2	4 24	8 1	1 18	5 6	1 54	5 5	10 54	8 2	11 28	8	
Half Mean Spring Range.			4 ft. 9 in.				3 ft. 10 in.				5 ft. 7 in.				
Phases of the Moon.							Moon's Declination at Noon.								
			D.	H.	M.		M.D.	°	'	M.D.	°	'	M.D.	°	'
First Quarter-			1	1	40	Morning.	1	6	8.41	9	16	8.7	17	15	N.29
Full - - - - -			8	8	27	Afternoon.	2	10	10	10	13	11	18	17	42
Last Quarter -			15	4	26	Afternoon.	3	13	18	11	9	27	19	18	53
New - - - - -			22	6	29	Afternoon.	4	15	53	12	5	9	20	18	56
First Quarter-			30	7	9	Afternoon.	5	17	49	13	0	33	21	17	56
In Apogee - -			1	3	0	Morning.	6	18	54	14	4	N.4	22	15	58
In Perigee - -			13	7	0	Afternoon.	7	19	1	15	8	27	23	13	15
In Apogee - -			28	10	0	Afternoon.	8	18	6	16	12	20	24	9	58

The times for High Water are given for Mean Time at Place ; if Dublin or Railway Time be required,—  
 BELFAST subtract 2 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 m.

JULY, 1865.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's AGE AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		L. M. F. I.	H. M. F. I.		
0 4 11 0	10 33	10 10	10 7 9 4	10 32	9 2	10 24	10 3	10 54	10 0									
1 4 10 9	11 38	10 9	11 3 9 1	11 35	9 0	11 24	9 10	11 53	9 9	9.2								
— — —	0 8	10 10	— — —	0 6	9 0	— — —	— — —	0 20	9 9	10.2								
0 39 11 0	1 9	11 2	0 38 9 1	1 11 9 3	0 50	9 10	1 21	10 0	11.2									
1 39 11 5	2 5	11 9	1 46 9 5	2 18 9 7	1 54	10 2	2 29	10 5	12.2									
2 30 12 1	2 53	12 6	2 45 9 10	3 11 10 2	2 58	10 8	3 26	10 11	13.2									
3 16 12 10	3 38	13 2	3 35 10 5	3 59 10 8	3 53	11 2	4 19	11 5	14.2									
4 0 13 7	4 22	13 11	4 22 10 11	4 45 11 2	4 44	11 8	5 8	11 11	0									
4 43 14 3	5 3	14 7	5 7 11 5	5 29 11 7	5 30	12 1	5 50	12 2	16.2									
5 24 14 9	5 44	14 10	5 51 11 8	6 11 11 10	6 11	12 4	6 31	12 6	17.2									
6 5 14 11	6 27	14 10	6 32 11 10	6 54 11 10	6 52	12 7	7 14	12 7	18.2									
6 50 14 9	7 13	14 7	7 16 11 9	7 38 11 8	7 37	12 7	7 59	12 6	19.2									
7 37 14 4	8 2	14 1	8 0 11 6	8 22 11 4	8 20	12 5	8 41	12 3	20.2									
8 28 13 9	8 54	13 3	8 44 11 1	9 8 10 10	9 2	12 1	9 24	11 10	21.2									
9 22 12 9	9 52	12 5	9 33 10 7	9 58 10 4	9 47	11 7	10 16	11 4	0									
0 23 12 2	10 57	12 0	10 24 10 1	10 56 9 11	10 46	11 0	11 17	10 9	23.2									
1 35 11 11	— — —	11 32 9 10	— — —	— — —	11 50 10 7	— — —	— — —	— — —	24.2									
0 11 11 11	0 46	12 0	0 8 9 9	0 45 9 10	0 23 10 6	0 57	10 6	6	25.2									
1 19 12 2	1 51	12 5	1 24 9 11	2 2 10 1	1 32 10 8	2 12	10 10	10	26.2									
2 21 12 9	2 51	13 1	2 37 10 3	3 9 10 6	2 49 11 1	3 24	11 4	27.2										
3 19 13 4	3 42	13 8	3 38 10 9	4 4 11 0	3 56 11 6	4 24	11 9	28.2										
4 5 13 11	4 28	14 2	4 28 11 2	4 51 11 4	4 51 11 11	5 14	12 0	0										
4 47 14 4	5 6	14 5	5 12 11 5	5 33 11 6	5 34 12 1	5 53	12 2	0.7										
5 26 14 5	5 45	14 5	5 53 11 6	6 12 11 6	6 13 12 2	6 32	12 2	1.7										
5 2 14 4	6 19	14 2	6 28 11 5	6 45 11 4	6 50 12 2	7 7	12 1	2.7										
5 37 14 0	6 54	13 9	7 2 11 3	7 19 11 1	7 24 12 0	7 40	11 11	3.7										
7 13 13 6	7 32	13 3	7 37 10 11	7 55 10 9	7 57 11 10	8 14	11 8	4.7										
7 51 12 11	8 10	12 7	8 12 10 6	8 28 10 4	8 30 11 6	8 47	11 3	5.7										
3 30 12 2	8 50	11 9	8 45 10 1	9 3 9 10	9 3 11 1	9 18	10 10	6.7										
0 11 11 3	9 35	10 11	9 22 9 7	9 42 9 4	9 36 10 7	9 59	10 4	0										
0 3 10 8	10 36	10 6	10 6 9 1	10 35 8 11	10 26 10 0	10 57	9 10	8.7										
Mean Spring Range. } 7ft. 5in.						5ft. 10in.						6ft. 2in.						

## Equation of Time at Noon.

M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
3 31	Sub.	9	4 53	Sub.	17	5 49	Sub.	25	6 13	Sub.
3 43		10	5 2		18	5 54		26	6 13	
3 54		11	5 10		19	5 58		27	6 13	
4 5		12	5 18		20	6 2		28	6 12	
4 15		13	5 25		21	6 5		29	6 10	
4 25		14	5 32		22	6 8		30	6 8	
4 35		15	5 38		23	6 10		31	6 6	
4 44		16	5 44		24	6 12				

if High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

AUGUST, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.				DEVONPORT.				PORTSMOUTH.			
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.	
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.
			H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.
Tu.	1	7 42 0	10 7	13 3	10 44	13 3	11 26	11 8	—	—	5 25	9 11	5 59	
W.	2	8 10	11 23	13 5	—	—	0 4	11 7	0 43	11 10	6 34	9 8	7 12	
Th.	3	9 3	0 1	13 8	0 36	14 2	1 23	11 11	2 2	12 6	7 48	10 1	8 25	
F.	4	9 57	1 7	14 9	1 37	15 6	2 38	12 7	3 11	13 5	8 58	10 9	9 29	
S.	5	10 52	2 2	16 4	2 26	17 1	3 43	13 5	4 11	14 5	9 56	11 6	10 21	
S.	6	11 47	2 48	17 10	3 10	18 7	4 37	14 3	5 2	15 3	10 44	12 2	11 6	
M.	7	morn.	3 32	19 2	3 52	19 7	5 25	15 0	5 48	15 11	11 28	12 8	11 48	
Tu.	8	0 42	4 14	20 0	4 36	20 3	6 11	15 6	6 34	16 4	—	—	0 11	
W.	9	1 36	4 56	20 4	5 17	20 5	6 57	15 11	7 16	16 5	0 33	13 2	0 56	
Th.	10	2 30	5 39	20 3	6 1	20 0	7 36	15 10	7 58	16 3	1 18	13 3	1 40	
F.	11	3 23	6 23	19 8	6 46	19 2	8 20	15 7	8 43	15 8	2 2	13 1	2 24	
S.	12	4 17	7 8	18 5	7 33	17 8	9 1	15 2	9 21	14 11	2 46	12 9	3 8	
S.	13	5 11	7 59	16 10	8 26	16 0	9 45	14 5	10 10	14 0	3 32	12 1	3 57	
M.	14	6 6	8 54	15 4	9 26	14 9	10 35	13 6	11 4	13 2	4 23	11 4	4 51	
Tu.	15	7 2	10 6	14 5	10 50	14 3	11 35	12 11	—	—	5 21	10 7	5 59	
W.	16	7 57	11 33	14 4	—	—	0 15	12 7	0 55	12 9	6 39	10 3	7 21	
Th.	17	8 50	0 15	14 7	0 51	15 0	1 38	12 7	2 19	13 2	8 3	10 6	8 41	
F.	18	9 43	1 23	15 6	1 50	16 1	2 55	13 1	3 30	13 11	9 14	11 1	9 44	
S.	19	10 32	2 16	16 8	2 38	17 3	3 59	13 9	4 25	14 8	10 11	11 7	10 34	
S.	20	11 20	2 58	17 9	3 17	18 2	4 49	14 4	5 12	15 1	10 54	12 0	11 13	
M.	21	0 8 6	3 36	18 5	3 54	18 7	5 31	14 8	5 50	15 5	11 32	12 4	11 50	
Tu.	22	0 50	4 13	18 8	4 30	18 9	6 9	14 11	6 26	15 6	—	—	0 9	
W.	23	1 33	4 46	18 9	5 1	18 7	6 44	15 0	6 59	15 4	0 27	12 5	0 44	
Th.	24	2 15	5 17	18 5	5 32	18 3	7 12	14 10	7 26	14 11	1 1	12 4	1 17	
F.	25	2 58	5 47	18 0	6 2	17 8	7 40	14 6	7 55	14 5	1 33	12 3	1 48	
S.	26	3 42	6 17	17 3	6 34	16 10	8 9	14 0	8 24	13 9	2 2	11 11	2 18	
S.	27	4 26	6 51	16 3	7 11	15 8	8 37	13 5	8 51	13 1	2 35	11 7	2 52	
M.	28	5 13	7 32	15 0	7 53	14 5	9 9	12 9	9 28	12 5	3 11	11 1	3 31	
Tu.	29	6 1	8 17	13 10	8 44	13 5	9 48	12 3	10 13	11 10	3 51	10 7	4 14	
W.	30	6 51	9 16	13 1	9 54	12 11	10 43	11 11	11 15	11 6	4 40	10 0	5 11	
Th.	31	7 44	10 37	13 1	11 21	13 4	11 53	11 10	—	—	5 47	9 8	6 27	

Half Mean Spring } 9<sup>ft.</sup> 6<sup>in.</sup>  
Range.7<sup>ft.</sup> 9<sup>in.</sup>6<sup>ft.</sup> 4<sup>in.</sup>

## Phases of the Moon.

	D.	H.	M.	
Full - - - -	7	5	29	Morning.
Last Quarter -	13	9	42	Afternoon.
New - - - -	21	7	17	Morning.
First Quarter -	29	11	46	Morning.
In Perigee - -	9	7	0	Afternoon.
In Apogee - -	25	3	0	Afternoon.

## Moon's Declination at Noon.

M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'
1	17	S. 0	9	2	S. 7	17	18	N. 9	25	7	
2	18	25	10	2	N. 37	18	16	31	26	10	
3	18	57	11	7	10	19	14	4	27	13	
4	18	29	12	11	15	20	11	1	28	16	
5	16	57	13	14	37	21	7	31	29	17	
6	14	23	14	17	4	22	3	45	30	18	
7	10	55	15	18	30	23	0	S. 7	31	18	
8	6	44	16	18	51	24	3	56			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 BREST add 18 m. | DEVONPORT add 17 m. | PORTSMOUTH add

AUGUST, 1865.

DOVER.						SHEERNESS.						LONDON.						C's Age at Noon.					
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
ime.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.							
M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	H.	M.	F.	L.	D				
1	14	3	5	32	14	0	6	38	12	11	7	11	12	10	8	6	15	11	8	38	15	9	9.7
3	13	11	6	38	14	1	7	48	12	9	8	25	12	10	9	14	15	7	9	51	15	6	10.7
14	14	5	7	51	14	11	9	3	13	0	9	39	13	3	10	28	15	7	11	5	15	9	11.7
23	15	5	8	52	16	0	10	13	13	7	10	42	14	0	11	42	16	0	—	—	—	—	12.7
19	16	7	9	44	17	2	11	11	14	5	11	35	14	9	0	15	16	5	0	43	16	10	13.7
9	17	8	10	33	18	3	11	58	15	2	—	—	—	1	7	17	4	1	30	17	9	14.7	
56	18	8	11	20	19	1	0	21	15	7	0	43	15	11	1	51	18	3	2	13	18	8	15.7
44	19	5	—	—	—	—	1	5	16	3	1	25	16	6	2	34	19	1	2	55	19	5	16.7
7	19	7	0	30	19	9	1	46	16	8	2	7	16	9	3	16	19	9	3	38	19	11	17.7
53	19	10	1	17	19	9	2	28	16	10	2	48	16	10	3	59	20	0	4	19	20	1	18.7
40	19	7	2	4	19	4	3	9	16	9	3	30	16	6	4	39	20	0	5	0	19	10	19.7
27	19	0	2	50	18	5	3	53	16	4	4	16	16	0	5	22	19	7	5	45	19	3	20.7
14	17	10	3	38	17	3	4	39	15	7	5	3	15	2	6	9	18	11	6	33	18	5	21.7
4	16	8	4	30	16	0	5	29	14	9	5	59	14	4	6	59	17	11	7	26	17	6	22.7
58	15	5	5	32	15	0	6	30	13	11	7	5	13	7	7	58	17	0	8	33	16	7	23.7
8	14	9	6	47	14	11	7	47	13	5	8	31	13	5	9	13	16	4	9	56	16	2	24.7
29	15	3	8	6	15	7	9	12	13	7	9	52	13	10	10	38	16	3	11	19	16	4	25.7
38	16	0	9	7	16	5	10	27	14	1	10	57	14	5	11	56	16	6	—	—	—	—	26.7
34	16	9	9	58	17	2	11	24	14	8	11	49	14	11	0	25	16	10	0	52	17	2	27.7
20	17	7	10	41	17	10	—	—	—	—	0	11	15	2	1	18	17	6	1	41	17	10	28.7
1	18	1	11	22	18	3	0	31	15	5	0	50	15	7	2	2	18	2	2	22	18	5	29.7
42	18	4	—	—	—	—	1	9	15	9	1	27	15	11	2	41	18	7	2	57	18	9	1.2
1	18	5	0	19	18	5	1	45	15	11	2	2	15	11	3	14	18	11	3	30	19	0	2.2
36	18	4	0	53	18	3	2	17	15	10	2	33	15	9	3	46	19	0	4	2	18	11	3.2
10	18	1	1	26	17	11	2	48	15	8	3	2	15	7	4	18	18	10	4	33	18	9	4.2
42	17	9	1	58	17	6	3	17	15	5	3	31	15	2	4	49	18	7	5	6	18	4	5.2
15	17	2	2	34	16	8	3	47	15	0	4	4	14	8	5	21	18	1	5	37	17	10	6.2
53	16	3	3	12	15	10	4	22	14	4	4	42	14	0	5	53	17	6	6	12	17	2	7.2
32	15	4	3	55	14	11	5	2	13	8	5	25	13	5	6	33	16	10	6	55	16	5	8.2
19	14	5	4	47	14	0	5	51	13	1	6	21	12	10	7	19	16	1	7	48	15	10	9.2
20	13	10	5	57	13	10	6	56	12	7	7	34	12	7	8	24	15	7	9	5	15	5	10.2
in Spring nge.			9ft. 4in.			8ft. 0in.			9ft. 7in.														

## Equation of Time at Noon.

S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
2		9	5 14		17	3 49		25	1 52	
58		10	5 5		18	3 36		26	1 36	
54		11	4 55		19	3 22		27	1 19	
49		12	4 46		20	3 8		28	1 1	
43		13	4 35		21	2 54		29	0 44	
36		14	4 24		22	2 39		30	0 26	
29		15	4 13		23	2 24		31	0 7	
22		16	4 1		24	2 8				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 D<sup>o</sup>VER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.

AUGUST, 1865.

WEEK DAY.			MONTH DAY.			MOON'S TRANSIT.			HARWICH.						HULL.						SUNDERLAND.																																						
									MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																																			
									Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.																																
									H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.																															
Tu.	1	7 20	5 47	9 7	6 17	9 6	0 23	16 2	0 55	16 0	9 42	10 9	10 17	10																																													
W.	2	8 10	6 55	9 6	7 34	9 7	1 28	15 10	2 1	15 10	10 52	10 8	11 27	10																																													
Th	3	9 3	8 11	9 8	8 46	9 10	2 35	16 1	3 8	16 7	12 0	11 0	—																																														
F.	4	9 57	9 20	10 0	9 50	10 3	3 41	17 1	4 11	17 9	0 32	11 5	1 1	11																																													
S.	5	10 52	10 20	10 7	10 46	10 10	4 40	18 4	5 4	18 11	1 30	12 4	1 57	12																																													
♄.	6	11 47	11 10	11 1	11 34	11 4	5 27	19 6	5 49	20 0	2 22	13 2	2 46	13																																													
M.	7	morn.	11 56	11 7	—	—	6 12	20 6	6 35	20 11	3 7	14 0	3 27	14																																													
Tu.	8	0 42	0 18	11 9	0 38	11 10	6 56	21 4	7 18	21 8	3 47	14 8	4 9	15																																													
W.	9	1 36	0 59	11 11	1 21	12 0	7 40	21 11	8 1	22 0	4 30	15 2	4 51	15																																													
Th.	10	2 30	1 42	12 0	2 3	11 11	8 22	22 1	8 44	21 11	5 12	15 3	5 34	15																																													
F.	11	3 23	2 25	11 10	2 48	11 9	9 6	21 8	9 29	21 3	5 56	14 9	6 20	14																																													
S.	12	4 17	3 11	11 7	3 34	11 5	9 52	20 9	10 14	20 2	6 44	14 2	7 8	13																																													
♄.	13	5 11	3 56	11 2	4 19	10 11	10 39	19 6	11 6	18 11	7 34	13 3	8 1	12																																													
M.	14	6 6	4 43	10 8	5 11	10 5	11 40	18 4	—	—	8 31	12 5	9 2	12																																													
Tu.	15	7 2	5 40	10 2	6 12	10 0	0 14	17 8	0 50	17 2	9 36	11 8	10 18	11																																													
W.	16	7 57	6 54	9 11	7 39	9 11	1 28	16 10	2 6	16 9	10 58	11 4	11 36	11																																													
Th.	17	8 50	8 20	10 0	8 59	10 2	2 43	17 0	3 21	17 5	—	—	0 13	11																																													
F.	18	9 43	9 34	10 4	10 6	10 7	3 56	17 10	4 26	18 4	0 46	11 11	1 16	12																																													
S.	19	10 32	10 35	10 9	11 0	10 11	4 53	18 9	5 17	19 2	1 45	12 8	2 12	12																																													
♄.	20	11 20	11 23	11 1	11 44	11 3	5 39	19 6	6 0	19 10	2 35	13 2	2 56	13																																													
M.	21	0 6	—	—	0 3	11 4	6 20	20 1	6 39	20 3	3 14	13 8	3 32	13																																													
Tu.	22	0 50	0 22	11 5	0 39	11 5	6 58	20 5	7 16	20 6	3 50	14 0	4 8	14																																													
W.	23	1 33	0 57	11 6	1 15	11 5	7 34	20 7	7 51	20 6	4 24	14 3	4 40	14																																													
Th.	24	2 15	1 32	11 4	1 47	11 3	8 6	20 5	8 21	20 4	4 56	14 1	5 11	13																																													
F.	25	2 58	2 3	11 2	2 19	11 1	8 37	20 2	8 52	19 11	5 27	13 9	5 43	13																																													
S.	26	3 42	2 35	11 0	2 49	10 10	9 7	19 6	9 23	19 2	5 58	13 3	6 15	13																																													
♄.	27	4 26	3 5	10 8	3 22	10 6	9 40	18 9	9 57	18 3	6 33	12 8	6 52	12																																													
M.	28	5 13	3 39	10 4	3 58	10 2	10 18	17 10	10 39	17 4	7 13	12 0	7 34	11																																													
Tu.	29	6 1	4 17	10 0	4 38	9 10	11 4	16 10	11 32	16 5	7 57	11 5	8 23	11																																													
W.	30	6 51	5 3	9 8	5 30	9 6	—	—	0 6	16 0	8 53	10 9	9 27	10																																													
Th.	31	7 44	6 2	9 5	6 42	9 5	0 40	15 3	1 16	15 7	10 6	10 6	10 46	10																																													
Half Mean Spring Range									5ft. 9in.									10ft. 5in.						7ft. 2in.																																			
Phases of the Moon.																														Moon's Declination at Noon.																													
D. H. M.																														M.D. ° ' M.D. ° ' M.D. ° ' M.D. ° '																													
Full - - - - 7 5 29 Morning.																														1 17 S. 0 9 2 S. 7 17 18 N. 9 25 7 S. 34																													
Last Quarter - 13 9 42 Afternoon.																														2 18 25 10 2 N. 37 18 16 31 26 10 S. 54																													
New - - - - 21 7 17 Morning.																														3 18 57 11 7 10 19 14 4 27 13 48																													
First Quarter 29 11 46 Morning.																														4 18 29 12 11 15 20 11 1 28 16 8																													
																														5 16 57 13 14 37 21 7 31 29 17 48																													
																														6 14 23 14 17 4 22 3 45 30 18 40																													
In Perigee - - 9 7 0 Afternoon.																														7 10 55 15 18 30 23 0 S. 7 31 18 36																													
In Apogee - - 25 3 0 Afternoon.																														8 6 44 16 18 51 24 3 56																													

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, — HARWICH subtract 5 m. HULL add 1 m. SUNDERLAND add 5 m.

## AUGUST, 1865.

WEEK DAY.	MONTH DAY.	NORTH SHIELDS.								LEITH.								THURSO.								C's AGE AT NOON.
		MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
		Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	Time.	Height.	H. M.	F. I.	
Tu.	1	9 54	9 7			10 30	9 7	8 46	12 3	9 24	12 2	2 38	9 3	3 17	9 1			3 17	9 1			9.7				
W.	2	11 5	9 8			11 40	9 10	10 0	12 3	10 34	12 4	3 57	9 1	4 34	9 2			4 34	9 2			10.7				
Th.	3	—	—			0 14	10 11	11 7	12 7	11 39	12 11	5 9	9 3	5 41	9 7			5 41	9 7			11.7				
F.	4	0 46	10 4			1 13	10 9	—	—	0 8	13 4	6 9	10 0	6 35	10 7			6 35	10 7			12.7				
S.	5	1 39	11 1			2 3	11 6	0 34	13 10	0 58	14 5	6 57	11 3	7 17	11 10			7 17	11 10			13.7				
Sa.	6	2 26	12 0			2 48	12 5	1 21	14 11	1 44	15 6	7 36	12 5	7 55	12 11			7 55	12 11			14.7				
Mo.	7	3 8	12 10			3 28	13 3	2 6	16 0	2 27	16 5	8 15	13 5	8 35	13 8			8 35	13 8			15.7				
Tu.	8	3 48	13 7			4 10	13 10	2 47	16 9	3 7	16 11	8 55	13 11	9 15	14 0			9 15	14 0			16.7				
W.	9	4 31	13 11			4 53	13 11	3 27	17 1	3 48	17 1	9 37	14 1	9 59	14 0			9 59	14 0			17.7				
Th.	10	5 15	13 11			5 37	13 9	4 9	17 0	4 32	16 11	10 22	13 11	10 45	13 7			10 45	13 7			18.7				
F.	11	6 0	13 7			6 24	13 4	4 55	16 8	5 18	16 5	11 9	13 3	11 33	12 11			11 33	12 11			19.7				
S.	12	6 47	13 1			7 10	12 8	5 42	16 1	6 6	15 8	11 58	12 5	—	—			—	—			20.7				
Sa.	13	7 36	12 3			8 5	11 9	6 33	15 1	7 0	14 7	0 24	11 11	0 52	11 5			0 52	11 5			21.7				
Mo.	14	8 37	11 2			9 11	10 9	7 32	14 1	8 5	13 7	1 23	11 0	1 55	10 7			1 55	10 7			22.7				
Tu.	15	9 49	10 6			10 30	10 4	8 40	13 3	9 23	13 0	2 32	10 2	3 17	9 11			3 17	9 11			23.7				
W.	16	11 10	10 4			11 49	10 5	10 5	13 0	10 43	13 1	4 3	9 10	4 43	9 9			4 43	9 9			24.7				
Th.	17	—	—			0 25	10 8	11 20	13 3	11 53	13 6	5 22	9 11	5 54	10 2			5 54	10 2			25.7				
F.	18	0 58	10 10			1 27	11 1	—	—	0 21	13 10	6 23	10 7	6 47	11 0			6 47	11 0			26.7				
S.	19	1 52	11 5			2 16	11 8	0 46	14 3	1 11	14 7	7 8	11 6	7 27	11 11			7 27	11 11			27.7				
Sa.	20	2 38	12 1			2 57	12 4	1 34	15 0	1 54	15 5	7 45	12 4	8 2	12 8			8 2	12 8			28.7				
Mo.	21	3 14	12 7			3 32	12 9	2 13	15 8	2 31	15 10	8 19	12 10	8 36	12 11			8 36	12 11			29.7				
Tu.	22	3 50	12 11			4 8	13 0	2 48	16 0	3 5	16 1	8 53	13 0	9 10	13 0			9 10	13 0			30.7				
W.	23	4 25	13 0			4 42	12 11	3 21	16 1	3 37	16 0	9 26	12 11	9 43	12 10			9 43	12 10			31.7				
Th.	24	4 59	12 9			5 15	12 8	3 53	15 10	4 9	15 8	9 59	12 8	10 15	12 6			10 15	12 6			32.7				
F.	25	5 31	12 6			5 47	12 4	4 25	15 6	4 41	15 3	10 31	12 3	10 47	12 0			10 47	12 0			33.7				
S.	26	6 2	12 1			6 18	11 11	4 56	15 1	5 12	14 10	11 4	11 8	11 23	11 4			11 23	11 4			34.7				
Sa.	27	6 35	11 8			6 54	11 4	5 31	14 6	5 51	14 2	11 42	11 0	—	—			—	—			35.7				
Mo.	28	7 15	11 0			7 37	10 7	6 12	13 9	6 33	13 4	0 3	10 7	0 25	10 2			0 25	10 2			36.7				
Tu.	29	8 2	10 3			8 29	9 10	6 56	13 0	7 24	12 7	0 48	9 10	1 15	9 6			1 15	9 6			37.7				
W.	30	9 2	9 7			9 39	9 5	7 56	12 4	8 31	12 1	1 47	9 3	2 23	9 0			2 23	9 0			38.7				
Th.	31	10 18	9 5			10 58	9 7	9 11	12 0	9 53	12 1	3 4	8 11	3 50	9 0			3 50	9 0			39.7				
Half Mean Spring Range.		6ft. 8in.								8ft. 2in.								6ft. 7in.								

Half Mean Spring } 6ft. 8in.  
Range.

8ft. 2in.

6ft. 7in.

## Equation of Time at Noon.

M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
1	6 2	Sub.	9	5 14	Sub.	17	3 49	Sub.	25	1 52	Sub.
2	5 58		10	5 5		18	3 36		26	1 36	
3	5 54		11	4 55		19	3 22		27	1 19	
4	5 49		12	4 46		20	3 8		28	1 1	
5	5 43		13	4 35		21	2 54		29	0 44	
6	5 36		14	4 24		22	2 39		30	0 26	
7	5 29		15	4 13		23	2 24		31	0 7	
8	5 22		16	4 1		24	2 8				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
 NORTH SHIELDS add 6 m.      LEITH add 12 m.      THURSO add 14 m.

## TIDE TABLES FOR THE

AUGUST, 1865.

WEEK DAY.			MONTH DAY.			MOON'S TRANSIT.			GREENOCK.						LIVERPOOL.						PEMBROKE.											
									MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
									Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.					
									H. M.		F. I.		H. M.		F. I.		H. M.		F. I.		H. M.		F. I.		H. M.		F. I.					
Tu.	1	7 20	6 51	8 2		7 25	8 1		5 10	19 7		5 48	19 6		—	—		—	—		—	—		0 8	15		0 8	15				
W.	2	8 10	7 0	8 0		7 36	8 1		6 28	19 7		7 6	19 9		0 41	14 11		1 21	15		2 40	15		1 21	15		2 40	15				
Th.	3	9 3	8 13	8 2		8 48	8 4		7 42	20 3		8 17	20 10		2 1	15 5		2 40	15		3 46	17		3 46	17		3 46	17				
F.	4	9 57	9 20	8 6		9 50	8 9		8 45	21 7		9 13	22 5		3 14	16 8		3 46	17		4 43	19		4 43	19		4 43	19				
S.	5	10 52	10 17	8 11		10 43	9 1		9 37	23 2		10 02	24 0		4 16	18 3		4 43	19		5 40	20		5 40	20		5 40	20				
♄	6	11 47	11 7	9 3		11 30	9 6		10 22	24 8		10 44	25 4		5 9	19 8		5 34	20		6 30	21		6 30	21		6 30	21				
M.	7	morn.	11 53	9 8		—	—		11 62	25 11		11 28	26 6		5 58	20 11		6 20	21		7 17	5		7 17	5		7 17	5				
Tu.	8	0 42	0 15	9 10		0 38	10 0		11 50	27 0		—	—		6 41	21 11		7 22	22		8 19	11		8 19	11		8 19	11				
W.	9	1 36	1 0	10 1		1 22	10 2		0 11	27 3		0 33	27 6		7 23	22 4		7 44	23		8 41	12		8 41	12		8 41	12				
Th.	10	2 30	1 43	10 2		2 5	10 2		0 54	27 7		1 16	27 5		8 6	22 2		8 28	21		9 25	13		9 25	13		9 25	13				
F.	11	3 23	2 27	10 2		2 50	10 1		1 38	26 11		1 59	26 6		8 51	21 6		9 13	21		10 10	14		10 10	14		10 10	14				
S.	12	4 17	3 12	9 11		3 33	9 9		2 21	25 11		2 43	25 2		9 34	20 4		9 56	19		10 53	15		10 53	15		10 53	15				
♄	13	5 11	3 56	9 6		4 21	9 4		3 62	24 4		3 32	23 6		10 19	18 11		10 43	18		11 40	16		11 40	16		11 40	16				
M.	14	6 6	4 48	9 2		5 15	8 11		3 59	22 8		4 30	21 10		11 7	17 5		11 34	16		12 31	15		12 31	15		12 31	15				
Tu.	15	7 2	5 46	8 8		6 25	8 6		5 42	21 2		5 47	20 10		—	—		0 8	16		1 5	16		1 5	16		1 5	16				
W.	16	7 57	7 5	8 4		7 46	8 4		6 34	20 9		7 16	20 11		0 46	16 0		1 32	16		2 29	17		2 29	17		2 29	17				
Th.	17	8 50	8 27	8 6		9 3	8 7		7 55	21 3		8 30	21 9		2 18	16 4		2 56	16		3 53	18		3 53	18		3 53	18				
F.	18	9 43	9 36	8 9		10 5	8 11		9 02	22 4		9 26	22 11		3 31	17 5		4 3	18		5 0	19		5 0	19		5 0	19				
S.	19	10 32	10 31	9 0		10 55	9 1		9 51	23 6		10 12	24 0		4 31	18 6		4 58	19		5 55	20		5 55	20		5 55	20				
♄	20	11 20	11 17	9 3		11 38	9 4		10 32	24 5		10 52	24 10		5 22	19 6		5 43	19		6 40	21		6 40	21		6 40	21				
M.	21	0 6	11 58	9 5		—	—		11 11	25 1		11 30	25 4		6 22	20 2		6 21	20		7 18	22		7 18	22		7 18	22				
Tu.	22	0 50	0 18	9 6		0 36	9 6		11 48	25 6		—	—		6 39	20 7		6 56	20		7 53	23		7 53	23		7 53	23				
W.	23	1 33	0 54	9 7		1 11	9 7		0 62	25 7		0 23	25 7		7 12	20 8		7 28	20		8 25	24		8 25	24		8 25	24				
Th.	24	2 15	1 28	9 7		1 44	9 7		0 39	25 6		0 54	25 4		7 44	20 4		7 59	20		8 56	25		8 56	25		8 56	25				
F.	25	2 58	1 58	9 7		2 13	9 6		1 9	25 1		1 24	24 9		8 15	19 11		8 29	19		9 26	26		9 26	26		9 26	26				
S.	26	3 42	2 28	9 5		2 44	9 3		1 38	24 3		1 53	23 10		8 45	19 2		9 2	18		10 0	27		10 0	27		10 0	27				
♄	27	4 26	3 0	9 2		3 16	9 0		2 10	23 3		2 27	22 9		9 18	18 2		9 36	17		10 13	28		10 13	28		10 13	28				
M.	28	5 13	3 34	8 11		3 54	8 9		2 45	22 2		3 5	21 6		9 54	17 2		10 13	16		11 10	29		11 10	29		11 10	29				
Tu.	29	6 1	4 15	8 7		4 38	8 5		3 26	20 10		3 51	20 3		10 33	16 0		10 56	15		11 53	30		11 53	30		11 53	30				
W.	30	6 51	5 5	8 3		5 36	8 1		4 21	19 8		4 55	19 3		11 23	14 11		11 56	14		12 54	31		12 54	31		12 54	31				
Th.	31	7 44	6 13	8 0		6 53	8 0		5 35	19 2		6 21	19 4		—	—		0 34	14		1 31	32		1 31	32		1 31	32				
Half Mean Spring Range. } 4ft. 10in.									13ft. 0in.									10ft. 6in.														
Phases of the Moon.									Moon's Declination at Noon.																							
D. H. M.									M.D. ° ' "						M.D. ° ' "						M.D. ° ' "						M.D. ° ' "					
Full - - - - 7 5 29 Morning.									1 17 8. 0						9 2 8. 7						17 18 N. 9						25 7 8. 34					
Last Quarter - 13 9 42 Afternoon.									2 18 25						10 2 N. 37						18 16 31						26 10 54					
New - - - - 21 7 17 Morning.									3 18 57						11 7 10						19 14 4						27 13 48					
First Quarter - 29 11 46 Morning.									4 18 29						12 11 15						20 11 1						28 16 8					
									5 16 57						13 14 37						21 7 31						29 17 48					
In Perigee - - 9 7 0 Afternoon.									6 14 23						14 17 4						22 3 45						30 18 40					
In Apogee - - 25 3 0 Afternoon.									7 10 55						15 18 30						23 0 8. 7						31 18 30					
									8 6 44						16 18 51						24 3 56											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—

GREENOCK add 19 m

LIVERPOOL add 18 m.

PEMBROKE add 20 m.



AUGUST, 1865.

ESTON-SUPER-MARE.				HOLYHEAD.				KINGSTOWN.				C's Age AT NOON.			
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.					
no.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.	Time. H. M. F. I.	Height. M. F. I.				
11	28 3	0 44	27 10	4 19	12 3	4 57	12 3	5 15	8 8	5 48	8 8	9.7			
20	27 9	1 58	28 0	5 33	12 3	6 8	12 5	6 21	8 8	6 55	8 10	10.7			
35	28 5	3 12	29 2	6 41	12 8	7 13	13 0	7 28	9 0	8 1	9 2	11.7			
49	30 2	4 24	31 4	7 41	13 5	8 9	13 10	8 32	9 5	9 2	9 8	12.7			
55	32 7	5 24	33 10	8 33	14 4	8 55	14 9	9 30	9 11	9 55	10 2	13.7			
50	35 0	6 15	36 1	9 17	15 3	9 38	15 8	10 17	10 5	10 36	10 9	14.7			
39	37 1	7 23	37 10	9 59	16 0	10 19	16 4	10 56	11 0	11 16	11 2	15.7			
25	38 8	7 46	39 2	10 40	16 7	10 59	16 9	11 38	11 4	11 59	11 4	16.7			
7	39 5	8 27	39 6	11 18	16 10	11 39	16 10	—	—	0 21	11 4	17.7			
48	39 5	9 9	39 1	—	—	0 2	16 9	0 43	11 4	1 6	11 3	18.7			
30	38 6	9 50	37 9	0 26	16 7	0 51	16 3	1 29	11 1	1 53	10 11	19.7			
9	36 8	10 28	35 6	1 16	15 11	1 40	15 6	2 16	10 9	2 40	10 6	20.7			
48	34 3	11 11	32 11	2 6	15 0	2 33	14 6	3 5	10 3	3 32	10 0	21.7			
36	31 8	—	—	3 4	14 1	3 36	13 7	4 2	9 9	4 35	9 5	22.7			
6	30 7	0 44	29 9	4 13	13 3	4 56	13 1	5 10	9 2	5 48	9 1	23.7			
25	29 5	2 7	29 6	5 38	13 0	6 16	13 2	6 26	9 1	7 4	9 2	24.7			
50	29 11	3 30	30 6	6 53	13 4	7 26	13 6	7 41	9 4	8 16	9 6	25.7			
6	31 4	4 41	32 2	7 56	13 10	8 22	14 2	8 48	9 8	9 18	9 10	26.7			
12	33 1	5 39	34 0	8 46	14 6	9 7	14 10	9 45	10 0	10 7	10 3	27.7			
3	34 10	6 24	35 4	9 27	15 1	9 46	15 4	10 26	10 5	10 43	10 7	28.7			
44	35 9	7 43	6 2	10 4	15 6	10 21	15 8	11 0	10 8	11 18	10 9	29.7			
23	36 6	7 40	36 8	10 37	15 9	10 53	15 9	11 36	10 10	11 53	10 10	30.7			
56	36 8	8 12	36 6	11 8	15 9	11 23	15 7	—	—	0 10	10 9	31.7			
27	36 4	8 41	36 2	11 39	15 6	11 56	15 4	0 27	10 8	0 43	10 7	32.7			
55	35 9	9 9	35 4	—	—	0 13	15 2	0 59	10 6	1 15	10 5	33.7			
23	34 9	9 38	34 0	0 29	14 11	0 46	14 8	1 31	10 3	1 47	10 0	34.7			
53	33 2	10 8	32 3	1 5	14 4	1 25	14 0	2 5	9 10	2 24	9 8	35.7			
23	31 4	10 40	30 4	1 45	13 8	2 6	13 3	2 45	9 6	3 6	9 4	36.7			
0	29 5	11 25	28 6	2 29	12 11	2 56	12 7	3 28	9 1	3 54	8 11	37.7			
56	27 9	—	—	3 28	12 3	4 4	12 1	4 26	8 9	5 0	8 7	38.7			
32	27 4	1 13	27 6	4 44	12 0	5 26	12 2	5 36	8 6	6 15	8 7	39.7			
at Spring age.				18 ft. 7 in.				8 ft. 0 in.				5 ft. 6 in.			

Equation of Time at Noon.

S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.	M. D.	M. S.	Sub.
2	Sub.	9	5 14	Sub.	17	3 49	Sub.	25	1 52	Sub.
58		10	5 5		18	3 36		26	1 36	
54		11	4 55		19	3 22		27	1 19	
49		12	4 46		20	3 8		28	1 1	
43		13	4 35		21	2 54		29	0 44	
36		14	4 24		22	2 39		30	0 26	
29		15	4 13		23	2 24		31	0 7	
22		16	4 1		24	2 8				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 ESTON-SUPER-MARE add 12 m. ! HOLYHEAD add 12 m. ! KINGSTOWN subtract 1 m. for Dublin Time.



AUGUST, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.						
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
			H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		
Tu.	1	7 22	4 56	8 0		5 29	7 11		2 31	5 5		3 7	5 6		—	—		0 2	8 8		
W.	2	8 10	6 3	7 11		6 39	7 11		3 40	5 8		4 12	5 10		0 37	8 1		1 12	8 8		
Th.	3	9 3	7 14	8 0		7 47	8 1		4 40	6 0		5 7	6 2		1 47	8 4		2 20	8 8		
F.	4	9 57	8 16	8 3		8 43	8 6		5 31	6 5		5 54	6 7		2 48	8 11		3 14	9 4		
S.	5	10 52	9 7	8 9		9 30	9 0		6 17	6 10		6 41	7 1		3 37	9 9		3 58	10 4		
♄.	6	11 47	9 53	9 2		10 14	9 4		7 4	7 3		7 27	7 6		4 19	10 6		4 40	10 11		
M.	7	morn.	10 35	9 6		10 56	9 7		7 50	7 9		8 10	7 11		5 2	11 3		5 24	11 6		
Tu.	8	0 42	11 17	9 8		11 36	9 9		8 30	8 1		8 49	8 2		5 46	11 8		6 6	11 10		
W.	9	1 36	11 56	9 9		—	—		9 8	8 1		9 28	8 1		6 26	11 10		6 48	11 9		
Th.	10	2 30	0 18	9 9		0 42	9 9		9 49	8 0		10 10	7 10		7 11	11 7		7 33	11 4		
F.	11	3 23	1 6	9 8		1 30	9 7		10 32	7 8		10 55	7 5		7 56	11 1		8 18	10 9		
S.	12	4 17	1 55	9 5		2 21	9 3		11 20	7 2		11 50	6 10		8 41	10 4		9 7	10 0		
♄.	13	5 11	2 48	9 1		3 16	8 11		—	—		0 24	6 6		9 37	9 8		10 11	9 4		
M.	14	6 6	3 46	8 8		4 17	8 6		1 2	6 2		1 42	6 0		10 46	9 0		11 22	8 9		
Tu.	15	7 2	4 51	8 4		5 29	8 3		2 25	5 11		3 7	5 11		—	—		0 3	8 8		
W.	16	7 57	6 8	8 2		6 48	8 2		3 45	6 1		4 19	6 3		0 42	8 8		1 21	8 8		
Th.	17	8 50	7 27	8 2		8 1	8 4		4 51	6 4		5 17	6 6		2 0	8 10		2 33	9 1		
F.	18	9 43	8 30	8 6		8 56	8 8		5 42	6 7		6 7	6 9		3 1	9 4		3 26	9 7		
S.	19	10 32	9 21	8 10		9 43	9 0		6 31	6 11		6 54	7 1		3 48	9 11		4 9	10 2		
♄.	20	11 20	10 3	9 2		10 21	9 3		7 15	7 3		7 35	7 4		4 29	10 5		4 48	10 8		
M.	21	0 6	10 39	9 4		10 57	9 4		7 54	7 5		8 11	7 6		5 8	10 10		5 27	11 0		
Tu.	22	0 50	11 15	9 4		11 31	9 4		8 28	7 7		8 44	7 7		5 45	11 1		6 1	11 1		
W.	23	1 33	11 46	9 4		—	—		8 58	7 6		9 13	7 5		6 16	11 0		6 32	10 11		
Th.	24	2 15	0 2	9 3		0 19	9 3		9 28	7 4		9 42	7 2		6 48	10 9		7 4	10 7		
F.	25	2 58	0 35	9 3		0 51	9 2		9 56	7 1		10 10	6 11		7 20	10 4		7 34	10 1		
S.	26	3 42	1 7	9 1		1 25	9 0		10 26	6 9		10 44	6 7		7 50	9 10		8 7	9 7		
♄.	27	4 26	1 44	8 11		2 5	8 9		11 3	6 4		11 27	6 1		8 25	9 3		8 46	9 9		
M.	28	5 13	2 26	8 7		2 48	8 5		11 54	5 10		—	—		9 19	8 9		9 35	8 6		
Tu.	29	6 1	3 11	8 3		3 38	8 2		0 24	5 7		0 57	5 5		10 3	8 3		10 37	8 4		
W.	30	6 51	4 8	8 0		4 41	7 11		1 34	5 4		2 16	5 3		11 13	7 11		11 51	7 11		
Th.	31	7 44	5 18	7 11		5 56	7 11		2 55	5 4		3 34	5 7		—	—		0 30	8 6		
Half Mean Spring Range.			4 ft. 9 in.						3 ft. 10 in.						5 ft. 7 in.						
Phases of the Moon.										Moon's Declination at Noon.											
			D.	H.	M.					M. D.	°	'	M. D.	°	'	M. D.	°	'	M. D.	°	'
Full - - - - -			7	5	29	Morning.				1	17	S. 0	9	2	S. 7	17	18	N. 9	25	7	S. 54
Last Quarter -			13	9	42	Afternoon.				2	18	25	10	2	N. 37	18	16	31	26	10	54
New - - - - -			21	7	17	Morning.				3	18	57	11	7	10	19	14	4	27	13	48
First Quarter			29	11	46	Morning.				4	18	29	12	11	15	20	11	1	28	16	8
										5	16	57	13	14	37	21	7	31	29	17	48
In Perigee - -			9	7	0	Afternoon				6	14	23	14	17	4	22	3	45	30	18	40
In Apogee - -			25	3	0	Afternoon				7	10	55	15	18	30	23	0	S. 7	31	18	36
										8	6	44	16	18	51	24	3	56			

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—  
**BELFAST** subtract 2 m.      |      **LONDONDERRY** add 4 m.      |      **SLIGO BAY** add 9 m.

## AUGUST, 1865.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's LOG AT NOON.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		Time. H. M. F. I.	Height.		
11 12 10 5			11 49 10 6			11 10 8 10			11 46 8 10			11 29 9 8			—			9.7
—	—		0 25 10 7	—		—	—		0 23 8 11	—		0 2 9 6	0 36 9 8		10 7			10.7
0 59 10 10			1 31 11 3	1 0 9 1		1 36 9 3	1 10 9 10		1 36 9 3	1 10 9 10		1 10 9 10	1 45 10 0		11 7			11.7
1 59 11 9			2 26 12 3	2 10 9 7		2 42 9 11	2 20 10 4		2 42 9 11	2 20 10 4		2 20 10 4	2 54 10 9		12 7			12.7
2 52 12 9			3 17 13 3	3 10 10 4		3 35 10 8	3 25 11 1		3 35 10 8	3 25 11 1		3 25 11 1	3 53 11 5		13 7			13.7
3 39 13 9			4 1 14 3	3 4 0 11 1		4 23 11 5	4 19 11 10		4 23 11 5	4 19 11 10		4 19 11 10	4 45 12 2		14 7			14.7
4 23 14 9			4 43 15 1	4 46 11 9		5 8 12 0	5 9 12 5		5 8 12 0	5 9 12 5		5 9 12 5	5 30 12 7		0			15.0
5 4 15 6			5 26 15 8	5 31 12 3		5 53 12 4	5 51 12 10		5 53 12 4	5 51 12 10		5 51 12 10	6 13 13 0		16 7			16.7
5 48 15 9			6 10 15 9	6 15 12 5		6 36 12 5	6 35 13 1		6 36 12 5	6 35 13 1		6 35 13 1	6 57 13 2		17 7			17.7
6 32 15 8			6 56 15 5	6 58 12 5		7 20 12 3	7 19 13 2		7 20 12 3	7 19 13 2		7 19 13 2	7 41 13 1		18 7			18.7
7 18 15 2			7 41 14 9	7 42 12 0		8 5 11 9	8 3 12 11		8 5 11 9	8 3 12 11		8 3 12 11	8 24 12 8		19 7			19.7
8 5 14 3			8 30 13 8	8 25 11 5		8 46 11 1	8 43 12 5		8 46 11 1	8 43 12 5		8 43 12 5	9 4 12 1		20 7			20.7
8 57 13 0			9 26 12 5	9 10 10 8		9 35 10 4	9 26 11 8		9 35 10 4	9 26 11 8		9 26 11 8	9 50 11 4					21.0
9 56 11 11			10 30 11 6	10 1 10 0		10 30 9 8	10 19 10 11		10 30 9 8	10 19 10 11		10 19 10 11	10 53 10 6		22 7			22.7
11 11 11 4			11 54 11 3	11 9 9 5		11 51 9 4	11 30 10 3		11 51 9 4	11 30 10 3		11 30 10 3	—		23 7			23.7
—	—		0 33 11 4	—		0 33 9 5	0 7 10 1		0 33 9 5	0 7 10 1		0 7 10 1	0 44 10 2		24 7			24.7
1 12 11 7			1 44 11 10	1 14 9 6		1 53 9 8	1 23 10 3		1 53 9 8	1 23 10 3		1 23 10 3	2 1 10 5		25 7			25.7
2 13 12 3			2 41 12 7	2 27 9 11		2 57 10 2	2 38 10 9		2 57 10 2	2 38 10 9		2 38 10 9	3 11 11 0		26 7			26.7
3 7 12 11			3 29 13 3	3 25 10 6		3 49 10 9	3 41 11 3		3 49 10 9	3 41 11 3		3 41 11 3	4 8 11 6		27 7			27.7
3 49 13 7			4 8 13 11	4 12 11 0		4 31 11 2	4 32 11 9		4 31 11 2	4 32 11 9		4 32 11 9	4 54 11 11		28 7			28.7
4 26 14 2			4 44 14 4	4 50 11 4		5 10 11 6	5 13 12 0		5 10 11 6	5 13 12 0		5 13 12 0	5 32 12 1					29.0
5 2 14 6			5 19 14 7	5 29 11 7		5 47 11 7	5 50 12 2		5 47 11 7	5 50 12 2		5 50 12 2	6 7 12 3		1 2			1.2
5 36 14 7			5 53 14 5	6 4 11 7		6 20 11 6	6 24 12 3		6 20 11 6	6 24 12 3		6 24 12 3	6 41 12 2		2 2			2.2
6 10 14 4			6 26 14 2	6 36 11 5		6 51 11 4	6 57 12 2		6 51 11 4	6 57 12 2		6 57 12 2	7 12 12 3		3 2			3.2
6 41 13 11			6 56 13 8	7 6 11 2		7 21 11 0	7 27 12 0		7 21 11 0	7 27 12 0		7 27 12 0	7 41 11 11		4 2			4.2
7 12 13 4			7 30 13 1	7 36 10 10		7 52 10 7	7 56 11 9		7 52 10 7	7 56 11 9		7 56 11 9	8 12 11 7		5 2			5.2
7 49 12 8			8 9 12 2	8 9 10 4		8 26 10 1	8 27 11 4		8 26 10 1	8 27 11 4		8 27 11 4	8 43 11 1		6 2			6.2
8 30 11 8			8 53 11 3	8 44 9 9		9 5 9 6	9 0 10 10		9 5 9 6	9 0 10 10		9 0 10 10	9 19 10 6		7 2			7.2
9 17 10 10			9 47 10 6	9 26 9 3		9 50 9 0	9 41 10 3		9 50 9 0	9 41 10 3		9 41 10 3	10 10 9 11					8.0
10 21 10 3			10 59 10 3	10 20 8 10		10 58 8 8	10 43 9 8		10 58 8 8	10 43 9 8		10 43 9 8	11 18 9 6		9 2			9.2
11 42 10 4			—	11 39 8 9		—	11 55 9 6		—	11 55 9 6		11 55 9 6	—		10 2			10.2
Mean Spring } Range.			7ft. 5in.			5ft 10in.						6ft. 2in.						

## Equation of Time at Noon.

M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.	M.D.	M. S.	Sub.
6 2		9	5 14		17	3 49		25	1 52	
5 58		10	5 5		18	3 36		26	1 36	
5 54		11	4 55		19	3 22		27	1 19	
5 49		12	4 46		20	3 8		28	1 1	
5 43		13	4 35		21	2 54		29	0 44	
5 36		14	4 24		22	2 39		30	0 26	
5 29		15	4 13		23	2 24		31	0 7	
5 22		16	4 1		24	2 8				

s of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

TIDE TABLES FOR THE

SEPTEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.				DEVONPORT.				PORTSMOUTH.				
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	
F.	1	8a37	—	—	0	2 13	10	0 35	11 7	1 18	12 5	7 9	9 10	7 49	10
S.	2	9 32	0 38	14 6	1	9 15	4	1 59	12 4	2 39	13 4	8 28	10 7	9 0	11
S.	3	10 27	1 36	16 3	2	3 17	3	3 14	13 4	3 44	14 5	9 30	11 6	9 57	11
M.	4	11 21	2 26	18 2	2	4 19	1	4 12	14 4	4 38	15 5	10 22	12 4	10 44	12
Tu.	5	morn.	3 9	19 11	3	30 20	5	5 4	15 3	5 27	16 2	11 5	13 0	11 26	13
W.	6	0 16	3 51	20 10	4	13 21	1	5 49	15 11	6 12	16 8	11 47	13 6	—	—
Th.	7	1 12	4 35	21 2	4	57 21	2	6 35	16 4	6 58	16 9	0 9	13 8	0 33	13
F.	8	2 7	5 19	21 0	5	40 20	8	7 19	16 4	7 40	16 5	0 57	13 8	1 20	13
S.	9	3 3	6 1	20 2	6	24 19	6	8 1	16 0	8 23	15 9	1 42	13 5	2 2	13
S.	10	4 0	6 47	18 8	7	10 17	9	8 43	15 5	9 3	14 11	2 25	12 11	2 48	13
M.	11	4 57	7 37	16 9	8	4 15	9	9 26	14 6	9 49	13 11	3 11	12 1	3 36	11
Tu.	12	5 53	8 34	14 11	9	8 14	3	10 16	13 7	10 45	12 10	4 2	11 3	4 31	10
W.	13	6 47	9 47	13 11	10	31 13	8	11 16	12 9	11 53	12 2	5 3	10 4	5 40	10
Th.	14	7 40	11 16	13 9	11	59 14	0	—	—	0 34	12 7	6 21	9 11	7 4	10
F.	15	8 30	—	—	0	35 14	5	1 18	12 2	1 59	13 0	7 46	10 3	8 25	10
S.	16	9 18	1 7	15 0	1	36 15	7	2 36	12 9	3 9	13 9	8 58	10 10	9 28	11
S.	17	10 3	1 59	16 3	2	20 16	10	3 37	13 5	4 2	14 4	9 53	11 5	10 15	11
M.	18	10 48	2 38	17 5	2	54 17	11	4 25	14 1	4 47	14 10	10 34	11 11	10 51	12
Tu.	19	11 31	3 12	18 3	3	29 18	6	5 6	14 7	5 24	15 3	11 8	12 3	11 25	12
W.	20	0a13	3 45	18 8	4	1 18	9	5 41	14 11	5 58	15 4	11 41	12 5	11 58	12
Th.	21	0 56	4 17	18 9	4	32 18	8	6 14	15 1	6 30	15 3	—	—	0 13	12
F.	22	1 39	4 47	18 7	5	2 18	5	6 44	15 0	6 57	14 11	0 30	12 5	0 47	12
S.	23	2 23	5 17	18 2	5	31 17	10	7 11	14 8	7 25	14 6	1 2	12 3	1 17	12
S.	24	3 8	5 47	17 6	6	3 17	2	7 39	14 3	7 54	13 11	1 33	12 1	1 48	11
M.	25	3 56	6 19	16 8	6	37 16	1	8 9	13 8	8 22	13 4	2 4	11 8	2 20	11
Tu.	26	4 44	6 58	15 6	7	19 14	11	8 39	13 2	8 59	12 8	2 38	11 3	2 58	11
W.	27	5 34	7 43	14 3	8	10 13	8	9 21	12 8	9 44	12 0	3 18	10 9	3 41	10
Th.	28	6 26	8 42	13 3	9	18 13	2	10 11	12 3	10 41	11 7	4 7	10 2	4 38	9
F.	29	7 18	10 0	13 2	10	45 13	5	11 16	12 1	—	—	5 12	9 9	5 52	9
S.	30	8 11	11 28	13 11	—	—	—	0 1	11 8	0 46	12 6	6 34	9 10	7 16	10
Half Mean Spring Range.			9ft. 6in.				7ft. 9in.				6ft. 4in.				
Phases of the Moon.							Moon's Declination at Noon.								
D. H. M.							M.D.	°	'	M.D.	°	'	M.D.	°	'
Full	-	-	-	5	1	52	Afternoon.	1	17	S.33	9	13	N.33	17	17
Last Quarter	-	-	-	12	4	57	Morning.	2	15	29	10	16	20	18	18
New	-	-	-	19	10	46	Afternoon.	3	12	26	11	18	4	19	0
First Quarter	-	-	-	28	2	47	Morning.	4	8	33	12	18	41	20	2
In Perigee							5	4	4	13	18	14	21	6	32
In Apogee							6	0	N.43	14	16	50	22	9	56
							7	5	28	15	14	36	23	12	56
							8	9	51	16	11	44	24	15	25

The times of High Water are given for Mean Time at Place ; if Greenwich or Railway Time be required, Brest add 18 m.      1      Devonport add 17 m.      1      Portsmouth add 4 m.

MONTH DAY.	DOVER.								SHEERNESS.								LONDON.								C's Age at Noon.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.	Time. H. M. F. I.	Height. H. M. F. I.							
1	6 35	14	1	7 15	14	7	8 20	12	9	9 0	13	0	9 46	15	5	10 26	15	7	11 2						
2	7 53	15	2	8 25	15	11	9 40	13	5	10 15	13	10	11 5	15	10	11 40	16	3	12 2						
3	8 53	16	7	9 20	17	3	10 44	14	4	11 12	14	10	—	—	0	10 16	9	13 2							
4	9 46	18	0	10 10	18	8	11 36	15	3	12 0	15	9	0 38	17	3	1 5	17	10 14 2							
5	10 33	19	3	10 56	19	8	—	—	0	21 16	3	1	28	18	5	1 50	19	0	15 2						
6	11 20	20	1	11 43	20	3	0 42	16	7	1 3	16	11	2 11	19	6	2 33	19	10	16 2						
7	—	—	0	7 20	5	1	24	17	2	1 45	17	3	2 53	20	2	3 15	20	5	17 2						
8	0 32	20	5	0 56	20	4	2 7	17	3	2 29	17	3	3 37	20	6	3 57	20	7	18 2						
9	1 19	20	1	1 41	19	8	2 50	17	2	3 10	16	11	4 19	20	5	4 39	20	3	19 2						
10	2 6	19	3	2 29	18	7	3 30	16	7	3 53	16	2	5 2	19	11	5 24	19	6	20 2						
11	2 52	17	11	3 17	17	2	4 17	15	9	4 41	15	2	5 48	19	0	6 11	18	6	21 2						
12	3 43	16	5	4 11	15	8	5 7	14	8	5 36	14	2	6 37	17	11	7 4	17	3	22 2						
13	4 40	15	0	5 14	14	7	6 9	13	8	6 47	13	3	7 38	16	9	8 14	16	4	23 2						
14	5 51	14	4	6 30	14	5	7 28	13	1	8 12	13	1	8 55	16	0	9 37	15	10	24 2						
15	7 12	14	9	7 50	15	2	8 55	13	3	9 36	13	6	10 21	15	10	11 3	16	0	25 2						
16	8 23	15	7	8 51	16	0	10 12	13	10	10 42	14	1	11 40	16	2	—	—	—	26 2						
17	9 16	16	6	9 38	16	11	11 10	14	5	11 32	14	9	0 8	16	6	0 35	16	10	27 2						
18	9 58	17	4	10 17	17	8	11 52	15	0	—	—	0	59	17	3	1 21	17	7	28 2						
19	10 36	17	11	10 55	18	2	0 11	15	4	0 28	15	6	1 40	17	11	1 58	18	3	29 2						
20	11 13	18	3	11 31	18	4	0 45	15	8	1 3	15	10	2 15	18	6	2 31	18	8	30 6						
1	11 47	18	5	—	—	1	1 18	15	11	1 34	15	11	2 46	18	10	3 1	18	11	31 6						
2	0 4	18	4	0 21	18	4	1 40	15	11	2 3	15	10	3 17	19	0	3 33	18	11	32 6						
3	0 37	18	2	0 54	18	0	2 18	15	9	2 33	15	8	3 47	18	11	4 3	18	10	33 6						
4	1 11	17	10	1 27	17	7	2 47	15	7	3 1	15	4	4 19	18											

***Equation of Time at Noon.***

[illegible]

mes of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m.                      SHEERNESS subtract 3 m.                      LONDON 0 m.



SEPTEMBER, 1865.

NORTH SHIELDS.				LEITH.				THURSO.				C'S AGE AT NOON.
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	
1 38	9 10	—	—	10 31	12 4	11 8	12 9	4 31	9 1	5 10	9 5	11 2
0 15	10 2	0 47	10 7	11 41	13 2	—	—	5 43	9 10	6 11	10 5	12 2
1 15	11 1	1 40	11 7	0 9	13 9	0 34	14 4	6 35	11 2	6 56	11 10	13 2
2 4	12 1	2 26	12 8	0 58	15 0	1 22	15 8	7 16	12 7	7 35	13 3	14 2
2 47	13 2	3 6	13 8	1 44	16 4	2 4	16 10	7 53	13 10	8 12	14 3	15 2
3 26	14 0	3 47	14 4	2 25	17 3	2 44	17 7	8 32	14 6	8 52	14 8	16 2
4 8	14 6	4 31	14 6	3 4	17 8	3 26	17 8	9 15	14 8	9 38	14 7	17 2
4 54	14 5	5 17	14 3	3 49	17 7	4 12	17 5	10 1	14 5	10 24	14 1	18 2
5 40	14 0	6 2	13 8	4 35	17 1	4 56	16 9	10 46	13 8	11 10	13 2	19 2
6 25	13 3	6 49	12 10	5 19	16 4	5 44	15 9	11 36	12 7	—	—	20 2
7 13	12 3	7 42	11 8	6 10	15 2	6 38	14 6	0 2	12 0	0 30	11 4	21 2
8 14	11 0	8 49	10 6	7 9	13 11	7 44	13 4	1 0	10 9	1 34	10 3	22 2
9 28	10 2	10 11	10 0	8 22	12 11	9 4	12 8	2 13	9 10	2 57	9 7	23 2
0 53	9 11	11 33	10 1	9 47	12 7	10 26	12 8	3 44	9 5	4 26	9 5	24 2
—	—	0 11	10 3	11 4	12 10	11 38	13 1	5 6	9 6	5 40	9 9	25 2
0 44	10 6	1 13	10 10	—	—	0 7	13 6	6 9	10 2	6 34	10 8	26 2
1 39	11 2	2 0	11 6	0 33	13 11	0 54	14 4	6 53	11 2	7 11	11 8	27 2
2 20	11 10	2 38	12 2	1 15	14 9	1 34	15 2	7 26	12 1	7 41	12 5	28 2
2 53	12 5	3 9	12 8	1 51	15 6	2 8	15 9	7 56	12 9	8 12	12 11	29 2
3 26	12 10	3 41	13 0	2 25	15 11	2 39	16 0	8 27	13 0	8 42	13 1	30 2
3 57	13 0	4 12	13 0	2 54	16 1	3 8	16 1	8 56	13 0	9 12	13 11	31 2
4 28	12 11	4 44	12 9	3 23	15 11	3 39	15 10	9 28	12 10	9 44	12 8	32 2
4 59	12 7	5 15	12 5	3 54	15 8	4 9	15 6	9 59	12 5	10 15	12 2	33 2
5 31	12 3	5 47	12 0	4 25	15 3	4 41	15 0	10 32	11 11	10 49	11 7	34 2
6 4	11 10	6 21	11 6	4 58	14 9	5 16	14 5	11 8	11 3	11 27	10 10	35 2
6 39	11 3	7 1	10 11	5 35	14 1	5 57	13 8	11 49	10 6	—	—	36 2
7 24	10 6	7 53	10 1	6 20	13 3	6 47	12 10	0 12	10 1	0 39	9 9	37 2
8 24	9 9	9 0	9 6	7 19	12 6	7 54	12 3	1 9	9 5	1 45	9 2	38 2
9 42	9 6	10 23	9 7	8 34	12 2	9 17	12 2	2 26	9 1	3 12	9 1	39 2
11 4	9 10	11 44	10 3	9 59	12 5	10 37	12 9	3 57	9 3	4 38	9 6	40 2
Mean Spring Range.				8ft. 2in.				6ft. 7in.				

Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
0 11		9	2 50		17	5 38		25	8 25	
0 30		10	3 11		18	5 59		26	8 45	
0 50		11	3 32		19	6 20		27	9 5	
1 9		12	3 53		20	6 41		28	9 25	
1 29		13	4 14		21	7 2		29	9 45	
1 49		14	4 35		22	7 23		30	10 4	
2 9		15	4 56		23	7 44				
2 30		16	5 17		24	8 4				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.



SEPTEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROK.																						
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																			
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																		
			H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	F. I.		H. M.	F. I.		H. M.	F. I.		H. M.	F. I.																
F.	1	8a37	7 34	8 1		8 14	8 3		7 4	19 9		7 43	20 5		1 19	15 0		2 3																			
S.	2	9 32	8 50	8 6		9 22	8 9		8 19	21 3		8 47	22 3		2 43	16 4		3 17																			
♄.	3	10 27	9 51	9 0		10 18	9 2		9 14	23 3		9 38	24 2		3 48	18 2		4 17																			
M.	4	11 21	10 43	9 5		11 7	9 8		10 0	25 2		10 22	26 0		4 45	20 0		5 11																			
Tu.	5	morn.	11 30	9 10		11 52	10 1		10 43	26 8		11 4	27 4		5 34	21 7		5 56																			
W.	6	0 16	—	—		0 15	10 3		11 26	27 11		11 48	28 3		6 17	22 8		6 39																			
Th.	7	1 12	0 37	10 4		1 0	10 5		—	—		0 11	28 5		7 2	23 2		7 24																			
F.	8	2 7	1 24	10 5		1 46	10 5		0 34	28 5		0 56	28 3		7 46	22 11		8 8																			
S.	9	3 3	2 7	10 4		2 27	10 2		1 18	27 9		1 38	27 0		8 29	22 0		8 52																			
♄.	10	4 0	2 49	10 0		3 12	9 9		2 0	26 4		2 23	25 4		9 14	20 7		9 36																			
M.	11	4 57	3 35	9 6		3 59	9 3		2 45	24 5		3 10	23 5		9 58	18 10		10 23																			
Tu.	12	5 53	4 26	9 0		4 55	8 9		3 37	22 4		4 9	21 5		10 49	17 0		11 16																			
W.	13	6 47	5 28	8 6		6 6	8 4		4 46	20 7		5 28	20 3		11 50	15 8		—																			
Th.	14	7 40	6 47	8 2		7 29	8 2		6 14	20 1		6 59	20 3		0 29	15 5		1 14																			
F.	15	8 30	8 11	8 3		8 47	8 5		7 39	20 8		8 16	21 2		2 0	15 9		2 40																			
S.	16	9 18	9 20	8 7		9 49	8 9		8 45	21 9		9 12	22 5		3 15	16 10		3 46																			
♄.	17	10 3	10 14	8 11		10 35	9 0		9 34	23 1		9 54	23 8		4 13	18 2		4 37																			
M.	18	10 48	10 55	9 2		11 14	9 3		10 12	24 2		10 29	24 7		4 58	19 3		5 18																			
Tu.	19	11 31	11 33	9 4		11 52	9 5		10 47	24 11		11 4	25 2		5 38	20 0		5 56																			
W.	20	0a13	—	—		0 9	9 6		11 21	25 5		11 37	25 7		6 12	20 6		6 28																			
Th.	21	0 56	0 25	9 7		0 41	9 7		11 52	25 7		—	—		6 43	20 8		6 58																			
F.	22	1 39	0 57	9 7		1 13	9 7		0 8	25 7		0 24	25 5		7 14	20 6		7 29																			
S.	23	2 23	1 28	9 7		1 43	9 6		0 39	25 3		0 54	25 0		7 43	20 1		7 59																			
♄.	24	3 8	1 58	9 5		2 13	9 4		1 9	24 7		1 24	24 2		8 15	19 5		8 31																			
M.	25	3 56	2 29	9 3		2 45	9 1		1 39	23 8		1 55	23 1		8 47	18 7		9 4																			
Tu.	26	4 44	3 2	9 0		3 21	8 10		2 12	22 7		2 31	21 11		9 22	17 6		9 40																			
W.	27	5 34	3 41	8 8		4 5	8 7		2 52	21 4		3 16	20 8		10 2	16 5		10 26																			
Th.	28	6 26	4 31	8 5		5 3	8 3		3 45	20 1		4 18	19 6		10 52	15 3		11 24																			
F.	29	7 18	5 38	8 2		6 18	8 1		4 58	19 4		5 42	19 5		—	—		0 1																			
S.	30	8 11	7 0	8 1		7 41	8 3		6 29	19 10		7 11	20 6		0 41	15 2		1 27																			
Half Mean Spring Range.			4ft. 10in.			13ft. 0in.			10ft. 6in.																												
Phases of the Moon.																					Moon's Declination at Noon.																
D. H. M.																					M.D. ° ' "																
Full - - - - 5 1 52 Afternoon.																					1 17 8.33 9 13 N.33 17 8 N.24 25 1																
Last Quarter - 12 4 57 Morning.																					2 15 29 10 16 20 18 4 45 26 1																
New - - - - 19 10 46 Afternoon.																					3 12 26 11 18 4 19 0 57 27 1																
First Quarter - 28 2 47 Morning.																					4 8 33 12 18 41 20 2 S.52 28 1																
																					5 4 4 13 18 14 21 6 32 29 1																
In Perigee - - 6 9 0 Afternoon.																					6 0 N.43 14 16 50 22 9 56 30 1																
In Apogee - - 22 4 0 Morning.																					7 5 28 15 14 36 23 12 56 30 1																
																					8 9 51 16 11 44 24 15 25 30 1																

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required GREENOCK add 19 m. LIVERPOOL add 12 m. PEMBROK add 30 m.

## SEPTEMBER, 1865.

WESTON-SUPER-MARE.										HOLYHEAD.										KINGSTOWN.										C's AGE At Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.	D.								
1 55 27	11	2 36 28	8	6 5 12	5	6 42 12	10	6 52 8	9	7 28 9	0	11 2																		
3 16 29	9	3 52 31	1	7 15 13	3	7 43 13	9	8 3 9	4	8 34 9	7	12 2																		
4 26 32	7	4 57 34	1	8 10 14	4	8 34 14	11	9 4 9	11	9 31 10	3	13 2																		
5 26 35	7	5 52 37	0	8 56 15	6	9 17 16	0	9 55 10	7	10 16 10	11	14 2																		
6 15 38	2	6 38 39	1	9 37 16	6	9 57 16	11	10 34 11	2	10 54 11	5	15 2																		
7 13 39	10	7 23 40	6	10 17 17	2	10 36 17	4	11 15 11	8	11 36 11	8	16 2																		
7 46 40	9	8 8 40	9	10 57 17	5	11 19 17	5	11 59 11	8	—	—	17 2																		
8 29 40	7	8 49 40	11	11 42 17	3	—	—	0 23 11	8	0 46 11	7	18 2																		
9 9 39	3	9 29 38	4	0 6 17	0	0 28 16	7	1 9 11	5	1 31 11	2	19 2																		
9 49 37	0	10 8 35	7	0 53 16	2	1 18 15	7	1 54 10	10	2 18 10	7	20 2																		
10 27 34	1	10 50 32	6	1 43 15	0	2 11 14	5	2 43 10	3	3 10 9	11	21 2																		
11 16 31	0	11 48 29	9	2 41 13	10	3 15 13	4	3 39 9	7	4 14 9	3	22 2																		
—	—	0 26 28	11	3 54 12	11	4 37 12	8	4 52 9	0	5 30 8	10	23 2																		
1 6 28	6	1 50 28	7	5 20 12	7	6 0 12	9	6 9 8	10	6 47 8	11	24 2																		
2 33 29	0	3 13 29	8	6 38 12	11	7 12 13	2	7 25 9	1	8 0 9	3	25 2																		
3 50 30	6	4 24 31	5	7 41 13	6	8 8 13	11	8 32 9	6	9 1 9	8	26 2																		
4 53 32	6	5 18 33	5	8 30 14	3	8 49 14	7	9 27 9	11	9 49 10	1	27 2																		
5 39 34	3	5 59 35	0	9 7 14	11	9 23 15	2	10 7 10	3	10 22 10	5	28 2																		
6 19 35	7	6 38 36	0	9 40 15	5	9 57 15	7	10 38 10	7	10 54 10	9	29 2																		
6 55 36	3	7 11 36	7	10 12 15	8	10 27 15	9	11 9 10	10	11 25 10	10	30 2																		
7 27 36	8	7 42 36	7	10 40 15	9	10 54 15	8	11 40 10	10	11 56 10	9	31 2																		
7 57 36	6	8 12 36	3	11 9 15	7	11 24 15	6	—	—	0 12 10	8	2 6																		
8 26 36	0	8 40 35	6	11 40 15	4	11 57 15	1	0 28 10	7	0 44 10	6	3 6																		
8 54 35	1	9 9 34	6	—	—	0 14 14	10	1 0 10	4	1 16 10	2	4 6																		
9 23 33	9	9 38 32	11	0 32 14	7	0 50 14	3	1 33 10	0	1 50 9	10	5 6																		
9 53 32	0	10 9 31	0	1 9 13	11	1 31 13	6	2 9 9	7	2 30 9	5	6 6																		
10 29 30	0	10 53 29	1	1 54 13	2	2 20 12	9	2 52 9	3	3 18 9	0	7 6																		
11 23 28	3	11 58 27	10	2 50 12	6	3 26 12	3	3 49 8	10	4 24 8	8	8 2																		
—	—	0 37 27	9	4 7 12	2	4 50 12	3	5 2 8	7	5 41 8	7	9 6																		
1 20 28	1	2 2 28	10	5 32 12	6	6 11 12	10	6 20 8	9	6 58 9	0	10 6																		
Mean Spring } 18 ft. 7 in.				8 ft. 0 in.				5 ft. 6 in.																						
Range.																														

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
0 11		9	2 50		17	5 38		25	8 25	
0 30		10	3 11		18	5 59		26	8 45	
0 50		11	3 32		19	6 20		27	9 5	
1 9		12	3 53		20	6 41		28	9 25	
1 29		13	4 14		21	7 2		29	9 45	
1 49		14	4 35		22	7 23		30	10 4	
2 9		15	4 56		23	7 44				
2 30		16	5 17		24	8 4				

s of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 1-SUPER-MARE add 12 m. ; HOLYHEAD add 18 m. ; KINGSTOWN subtract 1 m. for Dublin Time.



## TIDE TABLES FOR THE

SEPTEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
F.	1	8a37	6 36	7 11	7 15	8 0	4 9	5 10	4 41	6 1	1 10	8 2	1 48	8 5						
S.	2	9 32	7 49	8 2	8 17	8 5	5 8	6 4	5 31	6 7	2 22	8 10	2 49	9 3						
S.	3	10 27	8 43	8 9	9 8	9 0	5 55	6 10	6 18	7 2	3 14	9 9	3 36	10 4						
M.	4	11 21	9 31	9 3	9 53	9 6	6 42	7 6	7 5	7 9	3 57	10 8	4 18	11 2						
Tu.	5	morn.	10 13	9 8	10 33	9 10	7 27	8 0	7 48	8 2	4 39	11 6	5 11	11 10						
W.	6	0 16	10 54	9 11	11 14	9 11	8 7	8 5	8 27	8 6	5 23	12 1	5 44	12 3						
Th.	7	1 12	11 36	9 11	11 58	9 11	8 48	8 6	9 9	8 5	6 6	12 3	6 28	12 3						
F.	8	2 7	—	—	0 21	9 11	9 30	8 3	9 50	8 1	6 51	12 0	7 13	11 9						
S.	9	3 3	0 44	9 10	1 6	9 8	10 10	7 10	10 33	7 7	7 34	11 4	7 56	10 13						
S.	10	4 0	1 31	9 6	1 57	9 4	10 56	7 3	11 25	6 11	8 19	10 6	8 44	10 9						
M.	11	4 57	2 24	9 1	2 53	8 10	11 59	6 6	—	—	9 14	9 7	9 48	9 2						
Tu.	12	5 53	3 23	8 7	3 56	8 5	0 38	6 1	1 19	5 10	10 24	8 10	11 3	8 6						
W.	13	6 47	4 33	8 3	5 11	8 1	2 5	5 8	2 48	5 8	11 44	8 5	—	—						
Th.	14	7 40	5 50	8 0	6 31	8 0	3 28	5 10	4 4	6 0	0 25	8 4	1 5	8 4						
F.	15	8 30	7 11	8 0	7 46	8 2	4 37	6 2	5 5	6 4	1 44	8 6	2 19	8 9						
S.	16	9 18	8 15	8 4	8 42	8 7	5 29	6 5	5 52	6 7	2 47	9 1	3 13	9 4						
S.	17	10 3	9 4	8 9	9 24	8 11	6 14	6 10	6 35	7 0	3 34	9 8	3 52	10 0						
M.	18	10 48	9 43	9 1	10 0	9 2	6 54	7 2	7 12	7 3	4 9	10 4	4 26	10 7						
Tu.	19	11 31	10 16	9 3	10 33	9 4	7 30	7 4	7 47	7 6	4 43	10 9	5 11	10 11						
W.	20	0a13	10 48	9 4	11 3	9 4	8 2	7 7	8 17	7 7	5 18	11 0	5 34	11 1						
Th.	21	0 56	11 18	9 4	11 32	9 4	8 31	7 7	8 45	7 6	5 48	11 1	6 21	11 1						
F.	22	1 39	11 47	9 3	—	—	8 59	7 5	9 13	7 4	6 17	10 11	6 33	10 9						
S.	23	2 23	0 3	9 3	0 19	9 2	9 27	7 2	9 41	7 0	6 48	10 7	7 4	10 4						
S.	24	3 8	0 36	9 1	0 52	9 0	9 56	6 10	10 12	6 8	7 19	10 1	7 35	9 9						
M.	25	3 56	1 10	8 11	1 29	8 10	10 28	6 6	10 48	6 3	7 51	9 6	8 10	9 3						
Tu.	26	4 44	1 50	8 8	2 12	8 7	11 14	6 0	11 42	5 9	8 32	8 11	8 56	8 8						
W.	27	5 34	2 35	8 5	3 2	8 3	—	—	0 16	5 6	9 26	8 4	9 58	8 0						
Th.	28	6 26	3 32	8 1	4 5	8 0	0 52	5 5	1 35	5 4	10 35	8 0	11 15	8 0						
F.	29	7 18	4 43	7 11	5 23	7 11	2 19	5 4	3 0	5 6	11 56	8 1	—	—						
S.	30	8 11	6 3	7 11	6 43	8 0	3 38	5 9	4 13	6 1	0 36	8 3	1 15	8 6						
Half Mean Spring Range.			4 ft. 9 in.						3 ft. 10 in.						5 ft. 7 in.					
Phases of the Moon.							Moon's Declination at Noon.													
D. H. M.							M. D.	°	'	M. D.	°	'	M. D.	°	'	M. D.	°	'		
Full - - - - 5 1 52 Afternoon.							1	17	8.33	9	13	N.33	17	8	N.24	25	17	S.10		
Last Quarter - 12 4 57 Morning.							2	15	29	10	16	20	18	4	45	26	18	23		
New - - - - 19 10 46 Afternoon.							3	12	26	11	18	4	19	0	57	27	18	31		
First Quarter 28 2 47 Morning.							4	8	33	12	18	41	20	2	S.52	28	17	53		
							5	4	4	13	18	14	21	6	32	29	16	17		
In Perigee - - 6 9 0 Afternoon.							6	0	N.43	14	16	50	22	9	56	30	13	44		
In Apogee - - 22 4 0 Morning.							7	5	28	15	14	36	23	12	56					
							8	9	51	16	11	44	24	15	25					

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—  
 BELFAST subtract 3 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 m.

## SEPTEMBER, 1865.

MONTH DAY.	GALWAY.								QUEENSTOWN.								WATERFORD.								C'S AGE AT NOON.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		
	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	
1	0	22	10	7	1	0	11	0	0	20	8	11	1	0	9	2	0	33	9	7	1	11	9	10	11.2
2	1	33	11	6	2	0	12	2	1	40	9	6	2	13	9	10	1	48	10	3	2	23	10	8	12.2
3	2	28	12	9	2	53	13	5	2	43	10	4	3	11	10	9	2	56	11	1	3	26	11	6	13.2
4	3	17	14	0	3	39	14	7	3	37	11	3	4	1	11	8	3	55	12	0	4	21	12	5	14.2
5	4	0	15	2	4	21	15	8	4	23	12	0	4	44	12	4	4	45	12	9	5	7	13	0	15.2
6	4	41	16	1	5	2	16	4	5	6	12	7	5	29	12	9	5	28	13	3	5	49	13	5	16.2
7	5	25	16	5	5	49	16	5	5	53	12	10	6	16	12	10	6	13	13	6	6	37	13	6	17.2
8	6	12	16	3	6	34	15	11	6	38	12	9	7	0	12	7	6	59	13	6	7	20	13	4	18.2
9	6	56	15	6	7	19	15	0	7	21	12	3	7	43	11	11	7	40	13	1	8	1	12	10	19.2
10	7	43	14	5	8	8	13	9	8	5	11	6	8	25	11	1	8	23	12	6	8	44	12	1	20.2
11	8	35	13	0	9	4	12	3	8	49	10	7	9	15	10	2	9	5	11	8	9	29	11	2	21.2
12	9	35	11	7	10	12	11	2	9	41	9	9	10	12	9	5	9	58	10	9	10	35	10	4	22.2
13	10	52	10	11	11	35	10	10	10	51	9	2	11	32	9	1	11	12	10	0	11	50	9	10	23.2
14	—	—	—	—	0	17	10	11	—	—	—	—	0	15	9	1	—	—	—	—	0	28	9	10	24.2
15	0	56	11	2	1	30	11	6	0	57	9	3	1	37	9	5	1	7	10	0	1	45	10	2	25.2
16	1	58	11	10	2	25	12	3	2	11	9	8	2	41	10	0	2	21	10	5	2	54	10	9	26.2
17	2	49	12	8	3	11	13	1	3	7	10	3	3	29	10	7	3	22	11	1	3	47	11	4	27.2
18	3	29	13	5	3	46	13	8	3	49	10	10	4	8	11	0	4	8	11	7	4	29	11	9	28.2
19	4	3	14	0	4	20	14	3	4	26	11	3	4	44	11	5	4	49	11	11	5	7	12	0	29.2
20	4	35	14	5	4	51	14	6	5	1	11	6	5	17	11	7	5	23	12	1	5	38	12	2	30.2
21	5	6	14	7	5	22	14	6	5	33	11	7	5	49	11	7	5	54	12	3	6	10	12	3	31.2
22	5	38	14	5	5	54	14	3	6	5	11	6	6	20	11	5	6	26	12	2	6	41	12	2	32.2
23	6	9	14	1	6	25	13	10	6	35	11	4	6	51	11	2	6	57	12	1	7	12	11	1	33.2
24	6	41	13	7	6	58	13	3	7	6	10	11	7	22	10	9	7	27	11	10	7	42	11	8	34.2
25	7	15	12	11	7	34	12	6	7	38	10	6	7	55	10	3	7	57	11	6	8	13	11	3	35.2
26	7	56	12	1	8	18	11	7	8	12	10	0	8	31	9	8	8	30	11	0	8	47	10	9	36.2
27	8	43	11	1	9	11	10	8	8	54	9	5	9	18	9	2	9	8	10	5	9	34	10	2	37.2
28	9	44	10	5	10	23	10	4	9	47	8	11	10	22	8	10	10	7	9	10	10	44	9	8	38.2
29	11	5	10	5	11	48	10	8	11	3	8	10	11	46	8	11	11	23	9	7	—	—	—	—	39.2
30	—	—	—	—	0	28	11	1	—	—	—	—	0	27	9	2	0	1	9	8	0	39	9	11	40.2
Mean Spring Range.				7ft. 5in.				5ft. 10in.				6ft. 2in.													

## Equation of Time at Noon.

M.	S.	Add.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.	M.D.	M.	S.	Add.
0	11		9	2	50		17	5	38		25	8	25		25	8	25	
0	30		10	3	11		18	5	59		26	8	45		26	8	45	
0	50		11	3	32		19	6	20		27	9	5		27	9	5	
1	9		12	3	53		20	6	41		28	9	25		28	9	25	
1	29		13	4	14		21	7	2		29	9	45		29	9	45	
1	49		14	4	35		22	7	23		30	10	4		30	10	4	
2	9		15	4	56		23	7	44									
2	30		16	5	17		24	8	4									

Mean of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## TIDE TABLES FOR THE

OCTOBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.																																		
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																															
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																														
			H. M.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																												
M.	1	9 a 5	0	6	14	8	0	38	15	5	1	30	12	4	2	10	13	5	7	54	10	6	8	28	11	4																							
Tu.	2	9 59	1	9	16	5	1	35	17	5	2	44	13	4	3	17	14	6	9	0	11	6	9	29	12	6																							
W.	3	10 54	1	59	18	5	2	19	19	4	3	45	14	6	4	12	15	6	9	54	12	6	10	14	12	10																							
Th.	4	11 50	2	41	20	2	3	42	20	9	4	37	15	6	5	2	16	4	10	37	13	2	11	0	13	6																							
F.	5	morn.	3	26	21	2	3	49	21	5	5	25	16	3	5	48	16	9	11	22	13	8	11	45	13	16																							
S.	6	0 47	4	12	21	6	4	34	21	5	6	12	16	7	6	36	16	10	—	—	—	—	0	9	13	12																							
	7	1 46	4	56	21	2	5	18	20	9	6	55	16	7	7	16	16	5	0	33	13	9	0	56	13	8																							
M.	8	2 45	5	41	20	1	6	5	19	6	7	39	16	2	8	2	15	9	1	19	13	5	1	43	13	4																							
Tu.	9	3 43	6	29	18	7	6	52	17	7	8	24	15	6	8	46	14	10	2	6	12	10	2	30	12	5																							
W.	10	4 40	7	17	16	7	7	44	15	8	9	8	14	7	9	30	13	9	2	53	12	0	3	17	11	7																							
Th.	11	5 35	8	13	14	9	8	44	14	2	9	54	13	7	10	23	12	8	3	42	11	2	4	10	10	9																							
F.	12	6 26	9	22	13	8	10	3	13	6	10	53	12	9	11	28	12	0	4	40	10	4	5	15	10	8																							
S.	13	7 15	10	46	13	6	11	29	13	8	—	—	—	—	0	9	12	6	5	55	9	10	6	35	9	10																							
	14	8 2	—	—	—	—	0	6	14	0	0	49	12	0	1	29	12	10	7	16	10	0	7	53	10	2																							
M.	15	8 46	0	38	14	7	1	6	15	2	2	6	12	5	2	37	13	5	8	28	10	7	8	57	10	13																							
Tu.	16	9 29	1	31	15	9	1	51	16	4	3	6	13	3	3	30	14	1	9	23	11	2	9	45	11	5																							
W.	17	10 12	2	10	16	10	2	27	17	4	3	54	13	11	4	16	14	7	10	5	11	8	10	23	11	13																							
Th.	18	10 54	2	44	17	9	3	1	18	1	4	36	14	5	4	55	14	11	10	40	12	0	10	57	12	7																							
F.	19	11 37	3	16	18	3	3	31	18	3	5	12	14	10	5	28	15	1	11	12	12	3	11	27	12	4																							
S.	20	0 a 21	3	47	18	5	4	4	18	6	5	44	15	0	5	59	15	0	11	44	12	4	—	—	—	—																							
	21	1 6	4	20	18	5	4	35	18	4	6	16	15	0	6	32	14	11	0	1	12	4	0	18	12	5																							
M.	22	1 53	4	50	18	2	5	6	17	11	6	45	14	10	6	59	14	7	0	35	12	2	0	51	12	4																							
Tu.	23	2 41	5	22	17	7	5	39	17	4	7	14	14	6	7	29	14	1	1	7	12	0	1	23	11	13																							
W.	24	3 30	5	57	16	11	6	16	16	5	7	46	14	1	8	2	13	6	1	40	11	9	1	58	11	7																							
Th.	25	4 20	6	35	15	11	6	58	15	5	8	19	13	7	8	37	12	11	2	18	11	5	2	37	11	2																							
F.	26	5 11	7	22	14	11	7	47	14	4	8	58	13	2	9	22	12	4	2	58	11	0	3	21	10	9																							
S.	27	6 2	8	15	14	0	8	49	13	9	9	49	12	8	10	20	11	11	3	44	10	6	4	12	10	4																							
	28	6 53	9	27	13	9	10	9	14	0	10	53	12	5	11	33	11	11	4	44	10	2	5	20	10	1																							
M.	29	7 45	10	50	14	4	11	29	14	10	—	—	—	—	0	18	12	9	6	0	10	1	6	39	10	1																							
Tu.	30	8 38	—	—	—	—	0	4	15	7	0	58	12	6	1	38	13	6	7	16	10	7	7	53	11	1																							
	31	9 32	0	35	16	4	1	5	17	3	2	16	13	6	2	47	14	7	8	26	11	6	8	57	12	6																							
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.																																		
Phases of the Moon.																									Moon's Declination at Noon.																								
D. H. M.																									M.D. 0 1 M.D. 0 1 M.D. 0 1 M.D. 0 1																								
Full	—	—	4	10	31	Afternoon.																			1	10 S. 15	9	18 N. 31	17	18 S. 55	25	18 S. 1																	
Last Quarter	—	—	11	3	22	Afternoon.																			2	6 6	10	18 22	18	5 37	26	16 5																	
New	—	—	19	4	27	Afternoon.																			3	1 28	11	17 11	19	9 6	27	14 3																	
First Quarter	—	—	27	3	50	Afternoon.																			4	3 N. 21	12	15 8	20	12 13	28	11 3																	
																									5	7 59	13	12 25	21	14 51	29	7 4																	
																									6	12 5	14	9 11	22	16 52	30	3 2																	
In Perigee	—	—	5	6	0	Morning.																			7	15 21	15	5 37	23	18 9	31	1 N. 1																	
In Apogee	—	—	19	7	0	Morning.																			8	17 31	16	1 52	24	18 37																			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 Brest add 18 m.      Devonport add 17 m.      Portsmouth add 4 m.

OCTOBER, 1865.

MONTH DAY.	DOVER.								SHEERNESS.								LONDON.								D. Age at Noon.
	MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.							
1	7 20 15 3	7 53 16 0	9 7 13 5	9 43 13 11	10 32 15 11	11 10 16 4	11 6																		
2	8 24 16 9	8 52 17 6	10 14 14 4	10 43 14 11	11 45 16 10	—	—																		
3	9 17 18 3	9 40 18 11	11 9 15 5	11 32 15 11	0 12 17 5	0 36 18 0	13 6																		
4	10 4 19 6	10 28 20 0	11 52 16 5	—	0 59 18 7	1 23 19 2	0																		
5	10 53 20 4	11 18 20 6	0 14 16 9	0 37 17 1	1 45 19 7	2 7 20 0	15 6																		
6	11 43 20 7	—	0 59 17 4	1 22 17 6	2 28 20 4	2 50 20 7	16 6																		
7	0 7 20 7	0 31 20 5	1 45 17 6	2 6 17 4	3 12 20 8	3 35 20 8	17 6																		
8	0 56 20 1	1 21 19 8	2 27 17 3	2 49 17 1	3 58 20 6	4 20 20 3	18 6																		
9	1 46 19 3	2 10 18 7	3 11 16 7	3 35 16 2	4 43 19 11	5 5 19 6	19 6																		
10	2 34 17 10	2 58 17 1	3 59 15 8	4 23 15 1	5 29 18 11	5 53 18 4	20 6																		
11	3 23 16 5	3 50 15 8	4 48 14 7	5 16 14 1	6 19 17 9	6 46 17 3	21 6																		
12	4 18 14 11	4 50 14 5	5 48 13 8	6 22 13 3	7 15 16 8	7 51 16 3	22 6																		
13	5 26 14 2	6 3 14 2	7 2 13 0	7 45 12 11	8 32 15 11	9 13 15 9	23 6																		
14	6 42 14 5	7 19 14 9	8 27 13 0	9 7 13 3	9 54 15 8	10 34 15 10	24 6																		
15	7 53 15 3	8 22 15 9	9 43 13 7	10 14 13 10	11 11 15 11	11 42 16 3	25 6																		
16	8 46 16 2	9 8 16 7	10 41 14 3	11 5 14 6	—	0 10 16 7	26 6																		
17	9 28 16 11	9 47 17 3	11 24 14 9	11 42 15 0	0 32 16 11	0 52 17 4	27 6																		
18	10 7 17 6	10 25 17 9	11 59 15 3	—	1 13 17 8	1 31 17 11	28 6																		
19	10 41 17 11	10 59 18 1	0 17 15 5	0 34 15 7	1 48 18 2	2 2 18 4	29 6																		
20	11 17 18 2	11 34 18 2	0 49 15 8	1 4 15 9	2 19 18 6	2 35 18 8	30 6																		
21	11 52 18 1	—	1 20 15 10	1 36 15 9	2 50 18 9	3 6 18 10	31 6																		
22	0 9 18 1	0 26 18 0	1 52 15 8	2 7 15 7	3 23 18 9	3 38 18 9	2 8																		
23	0 44 17 10	1 17 17 7	2 22 15 6	2 37 15 5	3 53 18 8	4 8 18 6	3 8																		
24	1 19 17 5	1 38 17 2	2 52 15 3	3 9 15 0	4 23 18 4	4 39 18 2	4 8																		
25	1 58 16 10	2 18 16 5	3 27 14 9	3 46 14 6	4 57 17 11	5 15 17 7	5 8																		
26	2 39 16 1	3 2 15 9	4 6 14 2	4 28 13 11	5 35 17 4	5 56 17 0	6 8																		
27	3 25 15 4	3 52 14 11	4 53 13 8	5 19 13 5	6 21 16 9	6 47 16 5	7 8																		
28	4 22 14 7	4 55 14 6	5 50 13 2	6 28 13 0	7 18 16 3	7 54 16 0	8 8																		
29	5 30 14 7	6 5 14 10	7 7 13 1	7 51 13 3	8 34 16 0	9 17 16 0	9 8																		
30	6 42 15 5	7 19 16 0	8 30 13 6	9 7 13 11	9 58 16 2	10 35 16 6	10 8																		
31	7 51 16 9	8 20 17 5	9 41 14 5	10 11 14 11	11 11 16 11	11 40 17 5	11 8																		
Half Mean Spring Range.				9ft. 4in.				8ft. 0in.				9ft. 7in.													

## Equation of Time at Noon.

M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
1	10 24		9	12 45		17	14 37		25	15 50	
2	10 43		10	13 1		18	14 49		26	15 56	
3	11 1		11	13 16		19	14 59		27	16 2	
4	11 20		12	13 31		20	15 9		28	16 6	
5	11 37		13	13 46		21	15 19		29	16 10	
6	11 55		14	13 59		22	15 28		30	16 13	
7	12 12		15	14 13		23	15 36		31	16 16	
8	12 29		16	14 25		24	15 43				

times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m. | SHEERNESS subtract 3 m. | LONDON 0 m.

OCTOBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.						HULL.						SUNDERLAND.																												
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																									
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.																								
			H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.																							
S.	1	9 45	8 15	9 11		8 50	10 2		2 37	16 8	3 11	17 6																															
M.	2	9 59	9 21	10 6		9 52	10 11		3 43	18 3	4 12	19 1		0 33	12 3		1 2	12 10																									
Tu.	3	10 54	10 20	11 3		10 43	11 7		4 38	19 11	5 02	20 8		1 30	13 5		1 55	14 3																									
W.	4	11 50	11 5	11 11		11 27	12 2		5 20	21 4	5 43	21 10		2 17	14 6		2 39	14 11																									
Th.	5	morn.	11 50	12 4		—	—		6 7	22 4	6 30	22 8		3 0	15 4		3 22	15 7																									
F.	6	0 47	0 12	12 5		0 34	12 6		6 53	22 11	7 17	23 0		3 44	15 10		4 6	15 11																									
S.	7	1 46	0 57	12 5		1 20	12 4		7 39	22 11	8 12	22 9		4 28	15 10		4 50	15 8																									
S.	8	2 45	1 42	12 3		2 5	12 0		8 23	22 4	8 47	21 9		5 13	15 4		5 37	14 10																									
M.	9	3 43	2 29	11 9		2 53	11 6		9 11	21 1	9 35	20 3		6 2	14 4		6 27	13 9																									
Tu.	10	4 40	3 17	11 2		3 40	10 10		9 58	19 6	10 24	18 8		6 53	13 3		7 20	12 8																									
W.	11	5 35	4 3	10 6		4 29	10 3		10 55	18 0	11 30	17 3		7 48	12 2		8 20	11 8																									
Th.	12	6 26	4 59	10 0		5 30	9 9		—	—	0 7	16 7		8 53	11 3		9 33	10 11																									
F.	13	7 15	6 8	9 8		6 53	9 7		0 45	16 3	1 23	16 1		10 14	10 10		10 53	10 10																									
S.	14	8 2	7 35	9 8		8 15	9 9		2 1	16 2	2 37	16 7		11 30	11 0		—	—																									
S.	15	8 46	8 50	9 11		9 21	10 2		3 11	17 0	3 43	17 6		0 3	11 4		0 33	11 8																									
M.	16	9 29	9 45	10 5		10 15	10 7		4 10	18 0	4 34	18 6		1 0	12 1		1 24	12 5																									
Tu.	17	10 12	10 35	10 10		10 54	11 0		4 53	18 11	5 11	19 3		1 46	12 9		2 6	13 0																									
W.	18	10 54	11 12	11 2		11 30	11 3		5 28	19 7	5 46	19 10		2 24	13 3		2 42	13 5																									
Th.	19	11 47	11 47	11 4		—	—		6 3	20 0	6 19	20 1		2 58	13 7		3 12	13 9																									
F.	20	0 21	0 2	11 5		0 17	11 5		6 35	20 3	6 52	20 4		3 27	13 11		3 43	14 0																									
S.	21	1 6	0 33	11 5		0 49	11 4		7 8	20 4	7 24	20 3		3 58	14 1		4 14	14 0																									
S.	22	1 53	1 5	11 3		1 21	11 2		7 40	20 2	7 55	20 1		4 30	13 11		4 45	13 9																									
M.	23	2 41	1 36	11 1		1 52	11 0		8 11	19 10	8 27	19 7		5 1	13 7		5 17	13 4																									
Tu.	24	3 30	2 9	10 10		2 27	10 8		8 44	19 3	9 3	18 10		5 35	13 1		5 54	13 9																									
W.	25	4 20	2 45	10 7		3 4	10 5		9 23	18 5	9 42	18 0		6 15	12 6		6 36	13 2																									
Th.	26	5 11	3 23	10 3		3 44	10 1		10 4	17 7	10 30	17 3		7 0	11 11		7 25	11 8																									
F.	27	6 2	4 7	9 11		4 33	9 10		11 0	16 10	11 34	16 6		7 52	11 4		8 22	11 2																									
S.	28	6 53	5 1	9 9		5 35	9 8		—	—	0 13	16 3		8 59	11 0		9 38	11 0																									
S.	29	7 45	6 13	9 8		6 59	9 10		0 50	16 3	1 27	16 6		10 19	11 1		10 56	11 4																									
M.	30	8 38	7 38	10 0		8 15	10 3		2 3	16 11	2 37	17 6		11 30	11 9		—	—																									
Tu.	31	9 32	8 48	10 7		9 18	10 11		3 9	18 4	3 40	19 1		0 1	12 3		0 30	12 10																									
Half Mean Spring Range.			5 ft. 9 in.						10 ft. 5 in.						7 ft. 2 in.																												
Phases of the Moon.																						Moon's Declination at Noon.																					
			D. H. M.																																								
Full	—	—	4	10	31	Afternoon.				M.D.	0	1	M.D.	0	1	M.D.	0	1	M.D.	0	1																						
Last Quarter	11	3	22	Afternoon.				1	10	8.15	9	18	N. 31	17	18.55	25	18.11	26	16	51																							
New	—	—	19	4	27	Afternoon.				2	6	6	10	18	22	18	5	37	25	16	51																						
First Quarter	27	3	50	Afternoon.				3	1	28	11	17	11	19	9	6	27	14	38	27	14	38																					
										4	3	N. 21	12	15	8	20	12	13	28	11	35																						
In Perigee	—	—	5	6	0	Morning.				5	7	59	13	12	25	21	14	51	29	7	45																						
In Apogee	—	—	19	7	0	Morning.				6	12	5	14	9	11	22	16	52	30	3	25																						
										7	15	21	15	5	37	23	18	9	31	1	N. 11																						
										8	17	31	16	1	52	24	18	37																									

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 HARWICH subtract 5 m.      HULL add 1 m.      SUNDERLAND add 5 m.

OCTOBER, 1865.

WEEK DAY.	MONTH DAY.	NORTH SHIELDS.				LEITH.				THURSO.				C'S AGE. AT NOON.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	
	1	—	—	0 17 10	8	11 10 13	3	11 40 13	9	5 12 9	11	5 41 10	6	11.6
	2	0 45 11	2	1 13 11	8	—	—	0 7 14	5	6 9 11	2	6 32 11	11	12.6
	3	1 37 12	3	1 59 12	10	0 31 15	1	0 54 15	10	6 51 12	8	7 8 13	4	13.6
	4	2 19 13	4	2 40 13	10	1 15 16	6	1 37 17	0	7 27 14	0	7 47 14	5	○
	5	3 1 14	3	3 23 14	6	1 59 17	5	2 21 17	9	8 9 14	9	8 31 14	11	15.6
	6	3 45 14	8	4 8 14	9	2 42 17	11	3 4 17	11	8 53 14	11	9 15 14	9	16.6
	7	4 30 14	7	4 53 14	4	3 26 17	9	3 48 17	7	9 38 14	7	10 1 14	3	17.6
	8	5 17 14	1	5 41 13	8	4 11 17	3	4 35 16	9	10 26 13	8	10 51 13	2	18.6
	9	6 5 13	3	6 30 12	9	5 0 16	4	5 25 15	9	11 17 12	6	11 43 11	11	19.6
	10	6 55 12	2	7 23 11	7	5 51 15	1	6 19 14	5	—	—	0 11 11	3	20.6
	11	7 53 11	0	8 27 10	5	6 47 13	10	7 22 13	3	0 39 10	9	1 12 10	2	○
	12	9 3 10	1	9 46 9	10	7 57 12	10	8 38 12	6	1 48 9	9	2 30 9	5	22.6
	13	10 26 9	9	11 5 9	10	9 20 12	5	10 0 12	5	3 16 9	3	3 58 9	3	23.6
	14	11 43 10	1	—	—	10 37 12	7	11 10 12	10	4 38 9	4	5 12 9	6	24.6
	15	0 17 10	4	0 45 10	7	11 40 13	2	—	—	5 41 9	10	6 7 10	4	25.6
	16	1 11 10	11	1 33 11	2	0 5 13	7	0 27 14	0	6 28 10	9	6 45 11	3	26.6
	17	1 52 11	6	2 10 11	10	0 46 14	5	1 4 14	9	7 1 11	8	7 16 12	0	27.6
	18	2 27 12	2	2 43 12	4	1 22 15	1	1 40 15	5	7 31 12	4	7 45 12	7	28.6
	19	2 58 12	6	3 13 12	8	1 56 15	7	2 11 15	9	7 59 12	9	8 14 12	11	●
	20	3 28 12	9	3 44 12	10	2 26 15	11	2 41 15	11	8 29 12	11	8 44 12	10	0.8
	21	4 0 12	10	4 16 12	9	2 55 15	11	3 11 15	9	9 0 12	9	9 16 12	8	1.8
	22	4 32 12	8	4 48 12	6	3 27 15	8	3 43 15	6	9 32 12	6	9 49 12	3	2.8
	23	5 4 12	3	5 21 12	1	3 59 15	3	4 16 15	1	10 6 12	0	10 24 11	9	3.8
	24	5 39 11	11	5 58 11	8	4 34 14	10	4 52 14	7	10 44 11	5	11 5 11	1	4.8
	25	6 18 11	5	6 38 11	2	5 13 14	3	5 35 13	11	11 27 10	9	11 50 10	5	5.8
	26	7 2 10	10	7 29 10	6	5 59 13	7	6 24 13	3	—	—	0 16 10	2	6.8
	27	7 57 10	2	8 30 9	11	6 52 12	11	7 25 12	9	0 43 9	10	1 15 9	8	7.8
	28	9 9 9	10	9 51 9	11	8 3 12	7	8 43 12	6	1 54 9	6	2 35 9	6	8.8
	29	10 31 10	1	11 8 10	5	9 26 12	9	10 2 13	0	3 22 9	7	4 1 9	10	9.8
	30	11 44 10	10	—	—	10 37 13	5	11 8 13	11	4 38 10	1	5 10 10	6	10.8
	31	0 15 11	3	0 42 11	8	11 37 14	5	—	—	5 38 11	1	6 3 11	9	11.8
Half Mean Spring Range.		6ft. 8in.				8ft. 2in.				6ft. 7in.				

## Equation of Time at Noon.

M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
1	10 24	Add.	9	12 45	Add.	17	14 37	Add.	25	15 50	Add.
2	10 43		10	13 1		18	14 49		26	15 56	
3	11 1		11	13 16		19	14 59		27	16 2	
4	11 20		12	13 31		20	15 9		28	16 6	
5	11 37		13	13 46		21	15 19		29	16 10	
6	11 55		14	13 59		22	15 28		30	16 13	
7	12 12		15	14 13		23	15 36		31	16 16	
8	12 29		16	14 25		24	15 43				

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.



## OCTOBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.								LIVERPOOL.								PEMBROKE.								
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.							
			H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	H. M. F. L.	
S.	1	9 25	8 18	8 6	8 50	8 9	7 46	21 4	8 17	22 3	2 9	16 4	2 44	17 3													
M.	2	9 59	9 22	9 0	9 50	9 3	8 46	23 5	9 11	24 5	3 17	18 4	3 48	19 3													
Tu.	3	10 54	10 14	9 6	10 37	9 9	9 33	25 6	9 53	26 4	4 14	20 3	4 39	21 2													
W.	4	11 50	11 1	10 0	11 25	10 2	10 15	27 1	10 38	27 8	5 5	21 11	5 30	22 0													
Th.	5	morn.	11 49	10 3	—	—	11 1	28 3	11 24	28 7	5 53	22 11	6 16	23 4													
F.	6	0 47	0 13	10 5	0 37	10 6	11 48	28 8	—	—	6 40	23 5	7 23	24 4													
S.	7	1 46	1 0	10 6	1 22	10 5	0 11	28 7	0 33	28 5	7 23	23 1	7 45	22 8													
S.	8	2 45	1 45	10 4	2 8	10 2	0 56	27 11	1 19	27 1	8 8	22 0	8 33	21 5													
M.	9	3 43	2 31	10 0	2 54	9 9	1 42	26 3	2 5	25 3	8 56	20 6	9 18	19 7													
Tu.	10	4 40	3 16	9 6	3 40	9 3	2 28	24 3	3 51	23 3	9 40	18 8	10 47	17 11													
W.	11	5 35	4 6	9 0	4 34	8 9	3 17	22 3	4 48	21 4	10 29	16 11	10 54	16 1													
Th.	12	6 26	5 5	8 6	5 41	8 3	4 21	20 6	5 2	20 0	11 26	15 6	—	—													
F.	13	7 15	6 21	8 2	7 1	8 1	5 46	19 9	6 30	19 10	0 3	15 3	0 43	15 2													
S.	14	8 2	7 41	8 2	8 18	8 4	7 11	20 2	7 46	20 8	1 28	15 4	2 8	15 9													
S.	15	8 46	8 50	8 6	9 19	8 8	8 17	21 4	8 44	22 0	2 43	16 4	3 14	17 8													
M.	16	9 29	9 44	8 10	10 6	8 11	9 7	22 7	9 26	23 2	3 42	17 8	4 5	18 3													
Tu.	17	10 12	10 25	9 1	10 44	9 2	9 44	23 9	10 0	24 1	4 27	18 9	4 47	19 2													
W.	18	10 54	11 3	9 3	11 21	9 4	10 18	24 5	10 36	24 8	5 8	19 6	5 26	19 9													
Th.	19	11 37	11 38	9 4	11 55	9 5	10 51	24 11	11 7	25 2	5 42	20 0	5 58	20 2													
F.	20	0 21	—	—	0 12	9 6	11 23	25 3	11 40	25 3	6 14	20 4	6 31	20 5													
S.	21	1 6	0 28	9 6	0 45	9 6	11 56	25 3	—	—	6 47	20 4	7 2	20 3													
S.	22	1 53	1 1	9 6	1 17	9 6	0 12	25 2	0 28	25 0	7 17	20 0	7 33	19 10													
M.	23	2 41	1 33	9 5	1 49	9 4	0 44	24 9	1 0	24 4	7 49	19 6	8 6	19 2													
Tu.	24	3 30	2 5	9 3	2 23	9 2	1 16	23 11	1 33	23 5	8 25	18 10	8 44	18 4													
W.	25	4 20	2 42	9 1	3 1	8 11	1 52	22 11	2 11	22 5	9 2	17 11	9 22	17 5													
Th.	26	5 11	3 21	8 10	3 43	8 9	2 32	21 11	2 56	21 5	9 43	17 0	10 5	16 6													
F.	27	6 2	4 9	8 7	4 36	8 6	3 20	20 10	3 50	20 5	10 30	16 1	10 58	15 8													
S.	28	6 53	5 9	8 5	5 46	8 4	4 27	20 1	5 7	20 1	11 31	15 7	—	—													
S.	29	7 45	6 26	8 3	7 4	8 4	5 52	20 4	6 34	20 10	0 7	15 9	0 47	16 0													
M.	30	8 38	7 41	8 6	8 16	8 9	7 11	21 6	7 45	22 5	1 29	16 7	2 8	17 4													
Tu.	31	9 32	8 48	9 0	9 18	9 3	8 14	23 4	8 41	24 4	2 42	18 2	3 14	19 2													
Half Mean Spring Range.			4ft. 10in.								13ft. 0in.								10ft. 6in.								
Phases of the Moon.												Moon's Declination at Noon.															
D. H. M.												M.D. ° ' "															
Full - - - - 4 10 31 Afternoon.												1 10 8.15 9 18 N. 31 17 1 8.55 25 18 11															
Last Quarter - 11 3 22 Afternoon.												2 6 6 10 18 22 18 5 37 26 16 51															
New - - - - 19 4 27 Afternoon.												3 1 28 11 17 11 19 9 6 27 14 38															
First Quarter - 27 3 50 Afternoon.												4 3 N. 21 12 15 8 20 12 13 28 11 35															
In Perigee - - 5 6 0 Morning.												5 7 59 13 12 25 21 14 51 29 7 49															
In Apogee - - 19 7 0 Morning.												6 12 5 14 9 11 22 16 52 30 3 29															
												7 15 21 15 5 37 23 18 9 31 1 N. 10															
												8 17 31 16 1 52 24 18 37															

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, —  
 GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.

## OCTOBER, 1865.

ESTON-SUPER-MARE.						HOLYHEAD.						KINGSTOWN.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
10.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	D.	
41	30	0	3 18	31	3	6 44	13	4	7 13	13	10	7 31	9	4	8 3	9	8	11.6
54	32	9	4 27	34	4	7 41	14	6	8 7	15	1	8 34	10	0	9 3	10	4	12.6
55	36	0	5 21	37	5	8 29	15	8	8 48	16	3	9 28	10	8	9 48	11	0	13.6
46	38	7	6 11	39	7	9 10	16	9	9 32	17	3	10 8	11	3	10 29	11	6	14.6
35	40	3	6 59	40	11	9 54	17	5	10 15	17	7	10 51	11	9	11 13	11	10	15.6
22	41	2	7 44	41	1	10 36	17	8	10 56	17	7	11 36	11	10	11 59	11	9	16.6
6	40	9	8 28	40	2	11 18	17	4	11 42	17	1	—	—	—	0 22	11	8	17.6
50	39	3	9 12	38	3	—	—	—	0 7	16	7	0 45	11	5	1 9	11	2	18.6
32	36	10	9 51	35	4	0 33	16	2	0 59	15	6	1 34	10	10	1 59	10	6	19.6
10	33	10	10 31	32	5	1 25	14	11	1 52	14	4	2 24	10	2	2 51	9	10	20.6
56	30	10	11 25	29	8	2 20	13	9	2 53	13	3	3 19	9	7	3 52	9	3	21.6
—	—	—	0 12	28	8	3 29	12	10	4 11	12	6	4 27	9	0	5 5	8	10	22.6
40	28	3	1 21	28	1	4 53	12	5	5 33	12	6	5 44	8	9	6 21	8	10	23.6
3	28	5	2 40	29	0	6 11	12	8	6 44	12	11	6 57	8	11	7 31	9	1	24.6
17	29	10	3 50	30	9	7 13	13	3	7 40	13	8	8 3	9	4	8 31	9	6	25.6
20	31	8	4 45	32	7	8 3	14	0	8 22	14	4	8 57	9	9	9 19	9	11	26.6
8	33	6	5 29	34	2	8 40	14	8	8 56	14	11	9 39	10	1	9 56	10	3	27.6
49	34	9	6 7	35	3	9 13	15	1	9 29	15	3	10 12	10	5	10 27	10	7	28.6
24	35	7	6 41	35	10	9 44	15	5	9 59	15	6	10 41	10	8	10 56	10	9	29.6
58	36	0	7 15	36	3	10 14	15	7	10 28	15	7	11 12	10	9	11 28	10	9	30.6
31	36	2	7 46	36	0	10 43	15	6	10 57	15	5	11 44	10	8	12 0	10	7	31.6
1	35	10	8 16	35	7	11 12	15	3	11 29	15	1	—	—	—	0 16	10	6	32.6
31	35	2	8 47	35	8	11 47	14	11	—	—	—	0 33	10	5	0 50	10	3	33.6
3	34	2	9 20	33	5	0 5	14	8	0 26	14	5	1 8	10	1	1 27	9	11	34.6
36	32	8	9 53	31	10	0 47	14	1	1 9	13	9	1 47	9	9	2 8	9	7	35.6
12	31	1	10 32	30	3	1 32	13	6	1 57	13	3	2 31	9	5	2 56	9	3	36.6
57	29	6	11 29	29	0	2 24	12	11	2 56	12	8	3 22	9	1	3 55	8	11	37.6
—	—	—	0 6	28	9	3 35	12	7	4 16	12	7	4 32	8	10	5 10	8	10	38.6
45	29	0	1 25	29	6	4 59	12	9	5 36	13	1	5 47	8	11	6 23	9	2	39.6
3	30	4	2 40	31	6	6 11	13	6	6 42	14	0	6 58	9	5	7 30	9	9	40.6
16	32	9	3 51	34	2	7 10	14	6	7 37	15	1	8 0	10	0	8 30	10	4	41.6
n Spring } 18 ft. 7 in. ge.						8 ft. 0 in.						5 ft. 6 in.						

## Equation of Time at Noon.

S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
24		9	12 45		17	14 37		25	15 50	
43		10	13 1		18	14 49		26	15 56	
1		11	13 16		19	14 59		27	16 2	
20		12	13 31		20	15 9		28	16 6	
37		13	13 46		21	15 19		29	16 10	
55		14	13 59		22	15 28		30	16 13	
12		15	14 13		23	15 36		31	16 16	
29		16	14 25		24	15 43				

High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 -SUPER-MARE add 12 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.



## OCTOBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.						LONDONDERRY.						SLIGO BAY.																										
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.																							
			Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.	Time.	Height.	H. M. F. I.																					
S.	1	9 45	7 18	8 2		7 48	8 5		4 41	6 5		5 5	6 8		1 50	8 10		2 20	9 4																						
M.	2	9 59	8 16	8 9		8 41	9 0		5 28	7 0		5 51	7 3		2 47	9 9		3 11	10 3																						
Tu.	3	10 54	9 4	9 4		9 24	9 7		6 14	7 7		6 36	7 10		3 31	10 9		3 49	11 3																						
W.	4	11 50	9 46	9 9		10 8	9 11		6 58	8 1		7 21	8 4		4 12	11 8		4 35	12 4																						
Th.	5	morn.	10 30	10 0		10 52	10 1		7 44	8 6		8 6	8 7		4 58	12 3		5 21	12 3																						
F.	6	0 47	11 14	10 0		11 35	10 0		8 27	8 8		8 46	8 6		5 43	12 6		6 5	12 4																						
S.	7	1 46	11 57	9 11		—	—		9 7	8 4		9 29	8 2		6 27	12 2		6 50	11 12																						
S.	8	2 45	0 21	9 10		0 46	9 8		9 51	7 10		10 14	7 7		7 14	11 5		7 38	11 6																						
M.	9	3 43	1 12	9 6		1 38	9 4		10 38	7 3		11 5	6 10		8 1	10 5		8 25	9 11																						
Tu.	10	4 40	2 5	9 1		2 33	8 10		11 38	6 5		—	—		8 54	9 6		9 26	9 8																						
W.	11	5 35	3 2	8 7		3 35	8 5		0 15	6 1		0 55	5 10		10 1	8 9		10 38	8 3																						
Th.	12	6 26	4 8	8 3		4 46	8 1		1 39	5 8		2 23	5 7		11 19	8 3		11 58	8 2																						
F.	13	7 15	5 24	8 0		6 3	7 11		3 3	5 8		3 39	5 10		—	—		0 37	8 9																						
S.	14	8 2	6 43	8 0		7 18	8 1		4 12	6 0		4 40	6 2		1 16	8 4		1 50	8 6																						
S.	15	8 46	7 48	8 2		8 14	8 4		5 4	6 4		5 26	6 6		2 20	8 10		2 45	9 4																						
M.	16	9 29	8 36	8 7		8 56	8 9		5 47	6 8		6 6	6 10		3 7	9 5		3 25	9 9																						
Tu.	17	10 12	9 15	8 11		9 32	9 1		6 25	7 0		6 43	7 1		3 42	10 0		3 58	10 8																						
W.	18	10 54	9 49	9 2		10 5	9 3		7 1	7 3		7 18	7 4		4 15	10 6		4 32	10 8																						
Th.	19	11 37	10 20	9 3		10 35	9 4		7 34	7 5		7 49	7 5		4 48	10 9		5 4	10 11																						
F.	20	0 21	10 51	9 4		11 6	9 3		8 4	7 6		8 18	7 6		5 20	10 11		5 35	10 11																						
S.	21	1 6	11 21	9 3		11 35	9 3		8 33	7 5		8 47	7 4		5 51	10 10		6 5	10 9																						
S.	22	1 53	11 51	9 2		—	—		9 2	7 3		9 17	7 1		6 21	10 7		6 38	10 8																						
M.	23	2 41	0 8	9 2		0 26	9 1		9 32	6 11		9 48	6 9		6 55	10 3		7 12	10 6																						
Tu.	24	3 30	0 44	9 0		1 5	8 11		10 6	6 8		10 26	6 5		7 30	9 8		7 49	9 9																						
W.	25	4 20	1 26	8 9		1 49	8 8		10 48	6 3		11 15	6 0		8 9	9 2		8 33	8 11																						
Th.	26	5 11	2 14	8 6		2 40	8 5		11 47	5 9		—	—		9 1	8 8		9 31	8 6																						
F.	27	6 2	3 6	8 3		3 37	8 2		0 22	5 7		1 1	5 6		10 5	8 4		10 44	8 3																						
S.	28	6 53	4 14	8 1		4 51	8 1		1 46	5 6		2 28	5 7		11 24	8 4		—	—																						
S.	29	7 45	5 29	8 1		6 6	8 2		3 7	5 10		3 41	6 2		0 3	8 6		0 40	8 8																						
M.	30	8 38	6 43	8 3		7 16	8 5		4 11	6 5		4 37	6 9		1 16	8 11		1 48	9 4																						
Tu.	31	9 32	7 45	8 8		8 11	8 11		5 0	7 0		5 22	7 3		2 17	9 9		2 42	10 1																						
Half Mean Spring Range.			4 ft. 9 in.						3 ft. 10 in.						5 ft. 7 in.																										
Phases of the Moon.																					Moon's Declination at Noon.																				
D. H. M.																					M.D. ° ' "																				
Full - - - - 4 10 31 Afternoon.																					1 10 8.15 9 18 N. 31 17 18.55 25 18 S. 11																				
Last Quarter - 11 3 22 Afternoon.																					2 6 6 10 18 22 18 5 37 26 16 51																				
New - - - - 19 4 27 Afternoon.																					3 1 28 11 17 11 19 9 6 27 14 38																				
First Quarter - 27 3 50 Afternoon.																					4 3 N. 21 12 15 8 20 12 13 28 11 35																				
																					5 7 59 13 12 25 21 14 51 29 7 45																				
In Perigee - - 5 6 0 Morning.																					6 12 5 14 9 11 22 16 52 30 3 25																				
In Apogee - - 19 7 0 Morning.																					7 15 21 15 5 37 23 18 9 31 1 N. 10																				
																					8 17 31 16 1 52 24 18 37																				

The times for High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—

BELFAST subtract 2 m.

LONDONDERRY add 4 m.

SLIGO BAY add 9 m.

## OCTOBER, 1865.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's Age At Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		
H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		
2 11 7	1 31 12 3		1 5 9 6	1 40 9 11		1 14 10 3	1 49 10 8		11 6									
59 12 11	2 25 13 7		2 13 10 5	2 42 10 10		2 24 11 2	2 57 11 8		12 6									
49 14 3	3 10 14 10		3 8 11 4	3 31 11 9		3 24 12 1	3 50 12 6		13 6									
32 15 5	3 55 15 10		3 55 12 2	4 18 12 6		4 16 12 11	4 41 13 2		0									
17 16 3	4 40 16 6		4 41 12 9	5 5 12 11		5 4 13 4	5 27 13 6		15 6									
3 16 8	5 25 16 7		5 29 13 0	5 52 12 11		5 50 13 8	6 12 13 7		16 6									
48 16 4	6 11 16 0		6 14 12 10	6 37 12 7		6 35 13 6	6 59 13 4		17 6									
35 15 6	7 0 15 0		7 1 12 3	7 24 11 11		7 22 13 1	7 44 12 10		18 6									
24 14 4	7 49 13 8		7 47 11 6	8 8 11 0		8 6 12 5	8 27 12 0		19 6									
16 12 11	8 44 12 2		8 30 10 7	8 55 10 2		8 48 11 7	9 10 11 2		20 6									
14 11 6	9 47 11 1		9 21 9 8	9 50 9 4		9 37 10 8	10 10 10 3		21 6									
27 10 9	11 8 10 8		10 26 9 1	11 6 9 0		10 47 9 11	11 25 9 9		22 6									
49 10 8	—		11 47 8 11	—		—	0 2 9 8		23 6									
28 10 10	1 2 11 2		0 27 9 1	1 4 9 3		0 39 9 10	1 14 10 0		24 6									
31 11 7	1 57 12 0		1 40 9 6	2 10 9 9		1 48 10 3	2 21 10 7		25 6									
21 12 4	2 41 12 9		2 36 10 0	2 59 10 4		2 50 10 10	3 14 11 1		26 6									
1 13 1	3 18 13 4		3 19 10 7	3 38 10 10		3 37 11 4	3 57 11 7		27 6									
35 13 7	3 52 13 10		3 57 11 0	4 15 11 2		4 18 11 9	4 37 11 10		28 6									
7 14 0	4 22 14 2		4 31 11 3	4 47 11 4		4 54 11 11	5 10 12 0		●									
38 14 4	4 54 14 4		5 4 11 5	5 21 11 5		5 25 12 0	5 41 12 1		0 8									
11 14 4	5 27 14 3		5 38 11 5	5 54 11 4		5 58 12 1	6 14 12 0		1 8									
43 14 1	5 59 13 11		6 9 11 3	6 25 11 2		6 30 12 0	6 46 11 11		2 8									
15 13 8	6 33 13 5		6 41 11 0	6 58 10 10		7 2 11 10	7 19 11 9		3 8									
52 13 1	7 12 12 9		7 16 10 7	7 34 10 5		7 36 11 7	7 53 11 5		4 8									
33 12 5	7 56 12 0		7 53 10 2	8 12 9 11		8 11 11 2	8 30 11 11		5 8									
21 11 7	8 47 11 2		8 34 9 9	8 57 9 6		8 50 10 9	9 11 10 6		6 8									
17 10 11	9 53 10 9		9 22 9 4	9 53 9 2		9 39 10 3	10 16 10 1		7 8									
32 10 10	11 14 11 0		10 31 9 1	11 11 9 2		10 53 10 0	11 29 10 0		8 8									
52 11 4	—		11 50 9 4	—		—	0 4 10 1		9 8									
28 11 9	1 0 12 4		0 27 9 8	1 4 10 0		0 39 10 5	1 13 10 9		10 8									
28 12 11	1 54 13 6		1 38 10 4	2 10 10 10		1 47 11 2	2 21 11 7		11 8									
Mean Spring } 7ft. 5in. Range.						5ft. 10in.						6ft. 2in.						

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
0 24		9	12 45		17	14 37		25	15 50	
0 43		10	13 1		18	14 49		26	15 56	
1 1		11	13 16		19	14 59		27	16 2	
1 20		12	13 31		20	15 9		28	16 6	
1 37		13	13 46		21	15 19		29	16 10	
1 55		14	13 59		22	15 28		30	16 13	
2 12		15	14 13		23	15 36		31	16 16	
2 29		16	14 25		24	15 43				

High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 GALWAY add 11 m.      QUEENSTOWN add 8 m.      WATERFORD add 5 m.

## TIDE TABLES FOR THE

NOVEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.												
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.									
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.								
		H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.								
W.	1	10 28	1 29 18	2	1 53 19	0	3 16 14	8	3 44 15	5	9 23 12	4	9 48														
Th.	2	11 26	2 16 19	9	2 40 20	5	4 11 15	7	4 37 16	1	10 12 13	1	10 36														
F.	3	morn.	3 4 20	9	3 28 21	0	5 2 16	2	5 26 16	6	11 0 13	6	11 24														
S.	4	0 25	3 53 21	0	4 16 20	11	5 50 16	6	6 14 16	6	11 49 13	7	—														
♄.	5	1 26	4 39 20	9	5 22 20	4	6 38 16	6	6 59 16	2	0 13 13	6	0 38														
M.	6	2 25	5 23 19	9	5 47 19	2	7 21 16	1	7 42 15	7	1 2 13	3	1 25														
Tu.	7	3 23	6 10 18	6	6 33 17	8	8 4 15	6	8 24 14	9	1 48 12	9	2 11														
W.	8	4 18	6 58 16	10	7 24 16	0	8 46 14	8	9 9 13	8	2 34 12	0	2 58														
Th.	9	5 10	7 49 15	3	8 18 14	6	9 33 13	9	9 57 12	8	3 22 11	4	3 47														
F.	10	5 58	8 50 14	0	9 24 13	9	10 25 12	11	10 55 12	0	4 15 10	7	4 45														
S.	11	6 44	10 1 13	7	10 40 13	8	11 29 12	5	—	—	5 17 10	1	5 53														
♄.	12	7 28	11 18 13	9	11 53 14	1	0 6 11	10	0 43 12	6	6 29 9	11	7 6														
M.	13	8 10	—	—	0 23 14	6	1 20 12	3	1 54 12	0	7 40 10	3	8 13														
Tu.	14	8 53	0 50 14	11	1 15 15	5	2 24 12	11	2 50 13	7	8 41 10	9	9 6														
W.	15	9 35	1 36 15	11	1 56 16	4	3 16 13	8	3 40 14	0	9 30 11	3	9 51														
Th.	16	10 19	2 14 16	9	2 31 17	2	4 2 14	1	4 22 14	4	10 9 11	7	10 27														
F.	17	11 3	2 49 17	6	3 6 17	9	4 41 14	5	5 0 14	7	10 45 11	11	11 2														
S.	18	11 50	3 23 17	11	3 40 18	0	5 17 14	9	5 34 14	9	11 19 12	0	11 35														
♄.	19	on 38	3 57 18	0	4 14 18	0	5 50 14	11	6 7 14	9	11 53 12	1	—														
M.	20	1 27	4 31 18	0	4 47 17	11	6 25 15	0	6 41 14	7	0 11 12	1	0 29														
Tu.	21	2 17	5 4 17	9	5 20 17	6	6 55 14	10	7 12 14	4	0 47 12	0	1 4														
W.	22	3 8	5 39 17	4	5 59 17	1	7 29 14	7	7 47 13	11	1 22 11	11	1 40														
Th.	23	3 58	6 20 16	8	6 42 16	4	8 5 14	3	8 25 13	5	2 0 11	8	2 22														
F.	24	4 49	7 6 15	11	7 31 15	6	8 46 13	9	9 8 12	11	2 44 11	5	3 6														
S.	25	5 39	7 58 15	1	8 27 14	9	9 34 13	4	10 1 12	6	3 29 11	1	3 55														
♄.	26	6 29	8 58 14	8	9 34 14	9	10 31 13	0	11 4 12	4	4 23 10	9	4 53														
M.	27	7 20	10 12 14	10	10 49 15	1	11 43 13	0	—	—	5 27 10	6	6 3														
Tu.	28	8 13	11 26 15	6	—	—	0 23 12	9	1 2 13	6	6 38 10	8	7 13														
W.	29	9 8	0 2 16	1	0 33 16	8	1 40 13	6	2 17 14	3	7 49 11	3	8 23														
Th.	30	10 5	1 2 17	4	1 30 18	0	2 47 14	5	3 17 14	11	8 54 12	0	9 24														
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.												
Phases of the Moon.												Moon's Declination at Noon.															
												M.D.	°	'	M.D.	°	'	M.D.	°	'	M.D.	°	'				
Full - - - -												3	8	3	Morning.	1	5	N. 51	9	13	N. 19	17	14	S. 14	25		
Last Quarter -												10	5	45	Morning.	2	10	14	10	10	10	18	16	27	26		
New - - - -												18	11	0	Morning.	3	13	58	11	6	38	19	17	58	27		
First Quarter												26	2	59	Morning.	4	16	43	12	2	S. 54	20	18	39	28		
																5	18	17	13	0	S. 54	21	18	28	29		
In Perigee - -												2	6	0	Afternoon.	6	18	36	14	4	39	22	17	22	30		
In Apogee - -												15	0	0	Noon.	7	17	45	15	8	12	23	15	22			
																8	15	56	16	11	27	24	12	34			

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 Brest add 18 m.      Devonport add 17 m.      Portsmouth add 4 m.

## NOVEMBER, 1865.

WEEK DAY.	MONTH DAY.	DOVER.				SHEERNESS.				LONDON.				C's Age at Noon.
		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		
		Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	Time. H. M. F. I.	Height. F. I.	
W.	1	8 46	18 1	9 11	18 8	10 39	15 5	11 3	15 10	—	—	0 7	17 11	12.8
Th.	2	9 37	19 2	10 3	19 8	11 26	16 3	11 49	16 7	0 33	18 5	0 57	18 11	13.8
F.	3	10 28	20 0	10 55	20 2	—	—	0 13	16 11	1 20	19 4	1 44	19 9	0
S.	4	11 21	20 3	11 47	20 2	0 37	17 1	1 1	17 3	2 7	20 1	2 30	20 3	15.8
Mo.	5	—	—	0 12	20 0	1 25	17 3	1 48	17 2	2 54	20 4	3 16	20 4	16.8
Tu.	6	0 37	19 9	1 3	19 5	2 10	17 0	2 32	16 9	3 38	20 3	4 1	20 0	17.8
W.	7	1 28	18 11	1 51	18 6	2 53	16 5	3 16	16 1	4 25	19 8	4 48	19 4	18.8
Th.	8	2 14	17 10	2 38	17 3	3 40	15 8	4 3	15 2	5 13	18 11	5 36	18 5	19.8
F.	9	3 3	16 7	3 28	16 0	4 28	14 8	4 54	14 3	6 0	17 11	6 26	17 5	20.8
S.	10	3 55	15 5	4 23	14 10	5 22	13 10	5 53	13 6	6 53	17 0	7 24	16 7	21.8
Mo.	11	4 52	14 6	5 24	14 4	6 28	13 2	7 4	13 0	7 58	16 2	8 35	16 0	22.8
Tu.	12	5 57	14 3	6 32	14 5	7 43	13 0	8 21	13 2	9 10	15 10	9 46	15 9	23.8
W.	13	7 6	14 10	7 38	15 2	8 57	13 4	9 30	13 7	10 21	15 10	10 56	16 10	24.8
Th.	14	8 6	15 6	8 30	15 11	10 0	13 10	10 25	14 11	11 25	16 3	11 53	16 6	25.8
F.	15	8 53	16 3	9 14	16 7	10 49	14 4	11 10	14 7	—	—	0 18	16 9	26.8
S.	16	9 33	16 10	9 52	17 1	11 29	14 9	11 47	15 0	0 39	17 0	0 59	17 3	27.8
Mo.	17	10 12	17 4	10 30	17 6	—	—	0 4	15 2	1 20	17 6	1 37	17 9	28.8
Tu.	18	10 48	17 8	11 8	17 9	0 22	15 4	0 39	15 5	1 54	18 0	2 9	18 2	29.8
W.	19	11 26	17 9	11 45	17 10	0 56	15 6	1 12	15 7	2 26	18 3	2 42	18 5	30.8
Th.	20	—	—	0 3	17 10	1 29	15 7	1 46	15 6	2 58	18 6	3 14	18 6	31.8
F.	21	0 22	17 9	0 40	17 8	2 2	15 5	2 18	15 5	3 30	18 6	3 48	18 6	32.8
S.	22	0 59	17 7	1 19	17 5	2 34	15 4	2 50	15 2	4 5	18 5	4 21	18 3	33.8
Mo.	23	1 40	17 3	2 2	17 0	3 8	15 0	3 29	14 10	4 40	18 2	4 59	18 0	34.8
Tu.	24	2 24	16 9	2 47	16 6	3 51	14 8	4 13	14 5	5 21	17 9	5 42	17 7	35.8
W.	25	3 10	16 2	3 36	15 11	4 36	14 2	5 1	14 0	6 6	17 4	6 31	17 1	36.8
Th.	26	4 3	15 7	4 31	15 4	5 30	13 9	6 2	13 7	6 59	16 10	7 29	16 8	37.8
F.	27	5 2	15 3	5 33	15 3	6 37	13 5	7 14	13 7	8 3	16 7	8 40	16 7	38.8
S.	28	6 5	15 6	6 39	15 11	7 54	13 9	8 30	14 0	9 18	16 7	9 55	16 8	39.8
Mo.	29	7 16	16 5	7 48	16 11	9 5	14 4	9 39	14 8	10 32	16 11	11 5	17 3	40.8
Tu.	30	8 18	17 6	8 47	17 11	10 9	15 0	10 37	15 5	11 37	17 7	—	—	41.8
Half Mean Spring Range.		9ft. 4in.				8ft. 0in.				9ft. 7in.				

## Equation of Time at Noon.

M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
1	16 17		9	16 1		17	14 49		25	12 45	
2	16 18		10	15 55		18	14 36		26	12 26	
3	16 18		11	15 48		19	14 23		27	12 6	
4	16 17		12	15 40		20	14 8		28	11 45	
5	16 16		13	15 32		21	13 53		29	11 24	
6	16 13		14	15 22		22	13 37		30	11 3	
7	16 10		15	15 12		23	13 20				
8	16 6		16	15 1		24	13 3				

s times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 DOVER subtract 5 m.      SHEERNESS subtract 3 m.      LONDON 0 m.

## NOVEMBER, 1865.

WEEK DAY.			MONTH DAY.			MOON'S TRANSIT.			HARWICH.						HULL.						SUNDERLAND.														
									MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.											
									Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.								
									H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.							
W.	1	10	28	9	48	11	3	10	14	11	6	4	8	19	10	4	32	20	7	0	58	13	5	1	24										
Th.	2	11	26	10	37	11	9	11	1	12	0	4	54	21	2	5	16	21	8	1	49	14	4	2	14										
F.	3	MORN.		11	26	12	3	11	50	12	4	5	42	22	1	6	7	22	4	2	38	15	1	3	0										
S.	4	0	25	—	—			0	13	12	4	6	31	22	6	6	56	22	7	3	23	15	6	3	47										
S.	5	1	26	0	37	12	4	1	1	12	3	7	20	22	6	7	43	22	3	4	10	15	7	4	33										
M.	6	2	25	1	24	12	1	1	47	11	11	8	5	22	0	8	28	21	6	4	55	15	1	5	19										
Tu.	7	3	23	2	11	11	8	2	35	11	5	8	52	20	10	9	16	20	3	5	43	14	3	6	7										
W.	8	4	18	2	58	11	2	3	21	10	11	9	39	19	6	10	4	18	10	6	32	13	3	6	59										
Th.	9	5	10	3	44	10	7	4	8	10	4	10	31	18	2	11	2	17	7	7	26	12	3	7	54										
F.	10	5	58	4	35	10	1	5	4	9	11	11	37	17	0	—	—			8	25	11	6	8	59										
S.	11	6	44	5	36	9	9	6	10	9	8	0	13	16	6	0	47	16	3	9	35	11	0	10	12										
S.	12	7	28	6	51	9	8	7	29	9	9	1	21	16	2	1	55	16	3	10	47	10	11	11	21										
M.	13	8	10	8	5	9	10	8	37	10	0	2	27	16	6	2	59	17	0	11	51	11	4	—											
Tu.	14	8	53	9	7	10	2	9	33	10	4	3	28	17	5	3	54	17	10	0	19	11	8	0	44										
W.	15	9	35	9	58	10	6	10	21	10	8	4	18	18	3	4	39	18	7	1	8	12	3	1	31										
Th.	16	10	19	10	40	10	10	10	58	10	11	4	57	18	11	5	15	19	2	1	52	12	9	2	47										
F.	17	11	3	11	17	11	1	11	35	11	2	5	33	19	4	5	51	19	7	2	29	13	1	2	47										
S.	18	11	50	11	52	11	3	—	—			6	9	19	8	6	27	19	10	3	3	13	5	3	19										
S.	19	0	38	0	9	11	3	0	25	11	3	6	43	19	11	7	0	19	11	3	35	13	8	3	52										
M.	20	1	27	0	41	11	2	0	59	11	2	7	18	19	11	7	35	19	11	4	8	13	9	4	25										
Tu.	21	2	17	1	17	11	1	1	33	11	0	7	51	19	10	8	8	19	9	4	41	13	8	4	58										
W.	22	3	8	1	50	10	11	2	7	10	10	8	25	19	6	8	44	19	3	5	15	13	3	5	35										
Th.	23	3	58	2	26	10	9	2	47	10	7	9	5	18	11	9	27	18	8	5	56	12	10	6	19										
F.	24	4	49	3	9	10	6	3	30	10	5	9	49	18	4	10	12	18	1	6	43	12	5	7	8										
S.	25	5	39	3	52	10	3	4	15	10	2	10	38	17	9	11	11	17	5	7	33	12	0	8	3										
S.	26	6	29	4	43	10	1	5	12	10	0	11	46	17	3	—	—			8	34	11	8	9	8										
M.	27	7	20	5	44	10	0	6	20	10	1	0	22	17	1	0	57	17	2	9	45	11	7	10	22										
Tu.	28	8	13	7	2	10	2	7	38	10	3	1	31	17	3	2	3	17	7	10	56	11	10	11	27										
W.	29	9	8	8	12	10	6	8	46	10	9	2	34	18	1	3	6	18	9	11	58	12	7	—											
Th.	30	10	5	9	16	11	0	9	45	11	3	3	38	19	4	4	5	19	11	0	28	13	0	0	56										
Half Mean Spring } Range									5ft. 9in.									10ft. 5in.									7ft. 2in.								
Phases of the Moon.																		Moon's Declination at Noon.																	

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required  
 HARWICH subtract 5 m. | HULL add 1 m. | SUNDERLAND add 5 m.

## NOVEMBER, 1865.

WEEK DAY.	MONTH DAY.	NORTH SHIELDS.								LEITH.								THURSO.								C's AGE AT NOON.
		MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				
		Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			
		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.			H. M. F. I.	H. M. F. I.			H. M. F. I.	H. M. F. I.			H. M. F. I.	H. M. F. I.			H. M. F. I.	H. M. F. I.			D.	
W.	1	1 7 12 2	1 31 12 8	0 2 15 0	0 25 15 8	6 24 12 6	6 45 13 1	12 8																		
Th.	2	1 53 13 2	2 15 13 7	0 48 16 3	1 11 16 9	7 4 13 8	7 25 14 2	13 8																		
F.	3	2 38 14 0	3 1 14 3	1 35 17 2	1 59 17 6	7 47 14 6	8 10 14 8	13 8																		
S.	4	3 24 14 5	3 48 14 5	2 22 17 8	2 44 17 8	8 32 14 7	8 55 14 6	15 8																		
S.	5	4 11 14 4	4 35 14 2	3 7 17 6	3 30 17 3	9 19 14 3	9 43 13 11	16 8																		
M.	6	4 59 13 10	5 23 13 5	3 53 16 11	4 17 16 6	10 8 13 6	10 33 13 0	17 8																		
Tu.	7	5 47 13 1	6 11 12 8	4 42 16 1	5 6 15 8	10 57 12 6	11 22 11 11	18 8																		
W.	8	6 34 12 2	7 0 11 9	5 30 15 2	5 57 14 7	11 49 11 5	—	19 8																		
Th.	9	7 30 11 2	8 0 10 8	6 25 14 0	6 54 13 6	0 17 10 10	0 46 10 5	20 8																		
F.	10	8 33 10 3	9 10 10 0	7 28 13 1	8 3 12 9	1 18 10 0	1 54 9 8	21 8																		
S.	11	9 48 9 11	10 24 9 10	8 40 12 6	9 18 12 6	2 32 9 6	3 14 9 5	22 8																		
S.	12	10 59 9 11	11 33 10 1	9 54 12 6	10 27 12 8	3 52 9 4	4 28 9 5	23 8																		
M.	13	—	0 5 10 4	10 58 12 11	11 26 13 2	5 0 9 7	5 28 9 10	24 8																		
Tu.	14	0 32 10 7	0 56 10 10	11 51 13 5	—	5 52 10 2	6 13 10 6	25 8																		
W.	15	1 18 11 0	1 38 11 3	0 12 13 9	0 32 14 1	6 33 10 11	6 49 11 3	26 8																		
Th.	16	1 57 11 6	2 14 11 9	0 51 14 5	1 9 14 8	7 4 11 7	7 19 11 11	27 8																		
F.	17	2 31 12 0	2 47 12 2	1 27 15 0	1 44 15 3	7 34 12 2	7 50 12 5	28 8																		
S.	18	3 3 12 4	3 19 12 6	2 1 15 5	2 18 15 6	8 6 12 6	8 22 12 7	29 8																		
S.	19	3 36 12 7	3 52 12 7	2 34 15 7	2 49 15 7	8 38 12 7	8 54 12 6	1 0																		
M.	20	4 9 12 7	4 27 12 6	3 5 15 6	3 22 15 5	9 11 12 5	9 29 12 4	2 0																		
Tu.	21	4 44 12 4	5 1 12 3	3 39 15 4	3 56 15 2	9 46 12 2	10 4 12 0	3 0																		
W.	22	5 18 12 1	5 39 11 11	4 14 15 0	4 33 14 10	10 24 11 9	10 46 11 6	4 0																		
Th.	23	6 0 11 9	6 22 11 7	4 54 14 8	5 17 14 6	11 9 11 3	11 33 11 0	5 0																		
F.	24	6 45 11 5	7 10 11 2	5 41 14 3	6 6 13 11	11 58 10 9	—	6 0																		
S.	25	7 37 10 11	8 8 10 7	6 32 13 8	7 3 13 5	0 24 10 6	0 54 10 4	7 0																		
S.	26	8 42 10 5	9 18 10 4	7 37 13 3	8 12 13 2	1 27 10 2	2 3 10 1	8 0																		
M.	27	9 58 10 6	10 34 10 8	8 50 13 2	9 29 13 4	2 42 10 2	3 25 10 3	9 0																		
Tu.	28	11 8 10 11	11 40 11 2	10 2 13 7	10 34 13 10	4 1 10 4	4 34 10 7	10 0																		
W.	29	—	0 12 11 6	11 5 14 3	11 35 14 8	5 7 10 10	5 36 11 4	11 0																		
Th.	30	0 40 11 11	1 6 12 3	—	0 1 15 1	6 2 11 10	6 26 12 4	12 0																		
Half Mean Spring Range.		6ft. 8in.								8ft. 2in.								6ft. 7in.								

## Equation of Time at Noon.

M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.
1	16 17		9	16 1		17	14 49		25	12 45	
2	16 18		10	15 55		18	14 36		26	12 26	
3	16 18		11	15 48		19	14 23		27	12 6	
4	16 17		12	15 40		20	14 8		28	11 45	
5	16 16		13	15 32		21	13 53		29	11 24	
6	16 13		14	15 22		22	13 37		30	11 3	
7	16 10		15	15 12		23	13 20				
8	16 6		16	15 1		24	13 3				

10 times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required—for  
 NORTH SHIELDS add 6 m. | LEITH add 13 m. | THURSO add 14 m.

NOVEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.					
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.		
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.	
		H. M.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	F. I.	H. M.	F. I.	H. M.	F. I.		H. M.	F. I.	H. M.	
W.	1	10 28	9 44	9 6	10 9	9 8		9 52	5 3	9 28	26 1	3 42	20 1	4 9						
Th.	2	11 26	10 34	9 10	11 0	10 0		9 50	26 9	10 13	27 4	4 36	21 6	5 3						
F.	3	morn.	11 26	10 2	11 51	10 3		10 38	27 9	11 3	28 0	5 30	22 6	5 53						
S.	4	0 25	—	—	0 16	10 4		11 27	28 2	11 51	28 1	6 19	22 11	6 42						
So.	5	1 26	0 40	10 3	1 5	10 3		—	—	0 15	27 10	7 5	22 8	7 28						
M.	6	2 25	1 28	10 2	1 51	10 1		0 38	27 5	1 12	26 9	7 51	21 8	8 15						
Tu.	7	3 23	2 14	9 10	2 36	9 8		1 23	26 0	1 46	25 2	8 38	20 5	9 0						
W.	8	4 18	2 58	9 5	3 21	9 3		2 8	24 3	2 31	23 5	9 22	18 10	9 45						
Th.	9	5 10	3 46	9 1	4 11	8 10		2 56	22 7	3 22	21 9	10 8	17 5	10 33						
F.	10	5 58	4 39	8 8	5 10	8 5		3 53	21 0	4 27	20 4	10 59	15 11	11 28						
S.	11	6 44	5 43	8 4	6 19	8 2		5 42	20 1	5 44	19 11	—	—	0 1						
So.	12	7 28	6 55	8 2	7 31	8 2		6 24	20 0	7 12	20 4	0 37	15 4	1 17						
M.	13	8 10	8 5	8 4	8 35	8 6		7 33	20 9	8 42	21 3	1 54	15 10	2 28						
Tu.	14	8 53	9 3	8 7	9 28	8 9		8 28	21 9	9 51	22 3	2 57	16 9	3 23						
W.	15	9 35	9 51	8 10	10 11	8 11		9 12	22 9	10 31	23 2	3 49	17 10	4 11						
Th.	16	10 19	10 30	9 0	10 49	9 1		9 48	23 6	10 52	23 10	4 32	18 7	4 52						
F.	17	11 3	11 8	9 2	11 27	9 2		10 23	24 2	10 41	24 4	5 13	19 3	5 32						
S.	18	11 50	11 46	9 3	—	—		10 58	24 6	11 15	24 9	5 50	19 8	6 7						
So.	19	0 38	0 3	9 4	0 20	9 4		11 32	24 9	11 50	24 9	6 23	19 11	6 40						
M.	20	1 27	0 38	9 5	0 56	9 5		—	—	0 7	24 9	6 57	19 11	7 14						
Tu.	21	2 17	1 13	9 5	1 30	9 4		0 24	24 8	0 40	24 7	7 30	19 8	7 47						
W.	22	3 8	1 47	9 4	2 5	9 4		0 57	24 3	1 15	23 11	8 6	19 3	8 27						
Th.	23	3 58	2 25	9 3	2 46	9 2		1 35	23 7	1 56	23 6	8 48	18 8	9 9						
F.	24	4 49	3 7	9 1	3 29	9 0		2 18	22 10	2 40	22 6	9 30	18 0	9 52						
S.	25	5 39	3 53	8 11	4 20	8 10		3 42	22 0	3 31	21 7	10 16	17 3	10 41						
So.	26	6 29	4 47	8 9	5 18	8 8		4 22	3 4	4 36	21 0	11 7	16 7	11 38						
M.	27	7 20	5 53	8 7	6 29	8 6		5 14	21 1	5 55	21 3	—	—	0 11						
Tu.	28	8 13	7 4	8 7	7 39	8 9		6 33	21 9	7 8	22 3	0 46	16 10	1 25						
W.	29	9 8	8 14	8 11	8 45	9 2		7 42	23 0	8 12	23 8	2 5	17 10	2 39						
Th.	30	10 5	9 15	9 4	9 45	9 6		8 40	24 5	9 5	25 1	3 11	19 3	3 43						
Half Mean Spring Range.			4ft. 10in.						13ft. 0in.						10ft. 6in.					
Phases of the Moon.									Moon's Declination at Noon.											
D. H. M.									M.D. ° ' M.D. ° ' M.D. ° ' M.D. ° '											
Full - - - -	3	8	3 Morning.				1 5 N. 51 9 13 N. 19 17 14 S. 14 25													
Last Quarter-	10	5	45 Morning.				2 10 14 10 10 10 18 16 27 26													
New - - - -	18	11	0 Morning.				3 13 58 11 6 38 19 17 58 27													
First Quarter	26	2	59 Morning.				4 16 43 12 2 54 20 18 39 28													
							5 18 17 13 0 S. 54 21 18 28 29													
In Perigee - -	2	6	0 Afternoon.				6 18 36 14 4 39 22 17 22 30													
In Apogee - -	15	0	0 Noon.				7 17 45 15 8 12 23 15 22													
							8 15 56 16 11 27 24 12 34													

The times of High Water are given for Mean Time at Place ; if Greenwich or Railway Time be required  
GREENOCK add 19 m.      LIVERPOOL add 12 m.      PEMBROKE add 20 m.



## NOVEMBER, 1865.

WEEK DAY.	MONTH DAY.	WESTON-SUPER-MARE.								HOLYHEAD.								KINGSTOWN.								C's Age at Noon.			
		MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.							
		Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.			Time.	Height.						
		H. M. P. I.			H. M. P. I.					H. M. P. I.					H. M. P. I.					H. M. P. I.					H. M. P. I.				D.
V.	1	4 22 35	7		4 51 36	11		8 1 15	7		8 23 16	1		8 57 10	7		9 22 10	11		12.8									
h.	2	5 18 38	0		5 45 39	0		8 45 16	6		9 9 16	11		9 44 11	2		10 6 11	5		13.8									
.	3	6 12 39	7		6 38 40	0		9 32 17	1		9 55 17	3		10 29 11	7		10 52 11	8		15.8									
.	4	7 3 40	4		7 26 40	3		10 17 17	4		10 38 17	3		11 15 11	8		11 39 11	7		16.8									
.	5	7 49 40	0		8 11 39	5		11 0 17	1		11 24 16	9		—	—		0 3 11	6		17.8									
f.	6	8 33 38	8		8 54 37	9		11 49 16	5		—	—		0 27 11	4		0 52 11	1		18.8									
u.	7	9 15 36	9		9 34 35	5		0 14 16	0		0 39 15	6		1 16 10	9		1 40 10	6		19.8									
V.	8	9 54 34	2		10 14 32	10		1 5 14	11		1 31 14	5		2 4 10	2		2 30 9	11		20.8									
h.	9	10 35 31	8		11 0 30	5		1 58 13	11		2 27 13	6		2 57 9	8		3 25 9	5		21.8									
.	10	11 30 29	5		—	—		2 59 13	1		3 35 12	9		3 58 9	2		4 32 8	11		22.8									
.	11	0 3 28	9		0 38 28	5		4 13 12	7		4 51 12	6		5 7 8	10		5 42 8	9		23.8									
.	12	1 15 28	5		1 52 28	7		5 27 12	7		6 1 12	9		6 15 8	10		6 48 9	0		24.8									
L.	13	2 27 29	1		3 1 29	9		6 32 13	0		7 0 13	3		7 19 9	2		7 48 9	4		25.8									
u.	14	3 32 30	4		4 13 1	1		7 24 13	6		7 47 13	9		8 15 9	5		8 40 9	7		26.8									
V.	15	4 27 31	11		4 52 32	8		8 8 14	1		8 27 14	4		9 4 9	9		9 25 9	11		27.8									
h.	16	5 13 33	3		5 33 33	10		8 43 14	6		9 0 14	9		9 43 10	0		10 0 10	2		28.8									
.	17	5 54 34	4		6 14 34	9		9 17 14	11		9 34 15	10		10 15 10	4		10 32 10	5		29.8									
.	18	6 32 35	0		6 49 35	3		9 51 15	2		10 7 15	3		10 48 10	6		11 4 10	7		30.8									
.	19	7 7 35	5		7 24 35	6		10 22 15	3		10 37 15	3		11 20 10	7		11 37 10	7		31.8									
L.	20	7 41 35	6		7 57 35	5		10 53 15	2		11 10 15	1		11 55 10	6		—	—		32.8									
u.	21	8 13 35	3		8 29 35	0		11 27 15	0		11 45 14	11		0 13 10	5		0 30 10	4		33.8									
V.	22	8 46 34	9		9 5 34	4		—	—		0 5 14	8		0 48 10	3		1 8 10	1		34.8									
h.	23	9 24 33	10		9 42 33	4		0 28 14	6		0 51 14	3		1 29 9	11		1 51 9	10		35.8									
.	24	10 1 32	9		10 21 32	0		1 15 14	1		1 40 13	10		2 15 9	9		2 39 9	7		36.8									
.	25	10 43 31	5		11 8 30	10		2 6 13	7		2 35 13	5		3 4 9	6		3 33 9	4		37.8									
.	26	11 38 30	5		—	—		3 8 13	3		3 44 13	2		4 7 9	3		4 42 9	2		38.8									
L.	27	0 13 30	4		0 48 30	5		4 23 13	3		5 1 13	4		5 17 9	2		5 51 9	3		39.8									
u.	28	1 24 30	10		2 0 31	5		5 36 13	8		6 8 13	11		6 23 9	5		6 55 9	8		40.8									
V.	29	2 37 32	3		3 13 33	2		6 38 14	4		7 8 14	8		7 27 9	11		7 58 10	1		41.8									
h.	30	3 48 34	3		4 22 35	4		7 35 15	1		8 1 15	6		8 28 10	4		8 58 10	7		42.8									
Half Mean Spring Range.		18ft. 7in.								8ft. 0in.								5ft. 6in.											

Half Mean Spring } 18ft. 7in.

8ft. 0in.

5ft. 6in.

## Equation of Time at Noon.

L.D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
1	16 17		9	16 1		17	14 49		25	12 45	
2	16 18		10	15 55		18	14 36		26	12 26	
3	16 18		11	15 48		19	14 23		27	12 6	
4	16 17		12	15 40		20	14 8		28	11 45	
5	16 16		13	15 32		21	13 53		29	11 24	
6	16 13		14	15 22		22	13 37		30	11 3	
7	16 10		15	15 12		23	13 20				
8	16 6		16	15 1		24	13 3				

times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WESTON-SUPER-MARE add 13 m. | HOLYHEAD add 18 m. | KINGSTOWN subtract 1 m. for Dublin Time.



## NOVEMBER, 1865.

WEEK DAY.			MONTH DAY.			MOON'S TRANSIT.			BELFAST.								LONDONDERRY.								SLIGO BAY.																																		
									MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.																														
									Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.		Time.		Height.																												
									H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.	H.	M.	F.	I.																											
W.	1	10a28	8	35	9	3	8	58	9	6	5	45	7	6	6	8	7	9	3	4	10	8	3	25	4	11	6	4	11	6	4	11																											
Th.	2	11 26	9	21	9	8	9	45	9	10	6	32	8	0	6	57	8	2	3	47	11	6	4	11	6	4	11	6	4	11	6	4	11																										
F.	3	morn.	10	8	9	11	10	31	9	11	7	22	8	4	7	45	8	5	4	35	12	0	5	0	5	0	5	0	5	0	5	0	5	0																									
S.	4	0 25	10	54	9	11	11	16	9	11	8	7	8	6	8	28	8	5	5	24	12	3	5	40	5	40	5	40	5	40	5	40	5	40																									
♄.	5	1 26	11	39	9	10	—	—	—	—	8	50	8	3	9	12	8	0	6	9	12	0	6	33	12	0	6	33	12	0	6	33	12	0																									
M.	6	2 25	0	3	9	9	0	28	9	7	9	34	7	9	9	56	7	6	6	56	11	4	7	19	11	4	7	19	11	4	7	19	11	4																									
Tu.	7	3 23	0	53	9	5	1	18	9	4	10	19	7	3	10	43	6	11	7	42	10	5	8	51	10	5	8	51	10	5	8	51	10	5																									
W.	8	4 18	1	44	9	1	2	12	8	11	11	14	6	7	11	47	6	2	8	32	9	7	9	1	9	7	9	1	9	7	9	1	9																										
Th.	9	5 10	2	40	8	8	3	9	8	6	—	—	—	—	0	24	5	11	9	33	8	10	10	8	10	8	10	10	8	10	10	8	10																										
F.	10	5 58	3	40	8	4	4	14	8	2	1	3	5	9	1	46	5	7	10	45	8	5	11	21	11	21	11	21	11	21	11	21	11	21																									
S.	11	6 44	4	48	8	1	5	22	8	0	2	25	5	7	3	1	5	9	11	56	8	3	—	—	—	—	—	—	—	—	—	—	—	—																									
♄.	12	7 28	5	57	8	0	6	33	8	0	3	33	5	11	4	4	6	0	0	31	8	4	1	6	1	6	1	6	1	6	1	6	1	6																									
M.	13	8 10	7	5	8	1	7	34	8	2	4	29	6	2	4	53	6	4	1	38	8	7	2	7	2	7	2	7	2	7	2	7	2	7																									
Tu.	14	8 53	7	59	8	4	8	21	8	6	5	14	6	5	5	33	6	7	2	31	9	0	2	52	0	2	52	0	2	52	0	2	52	0	2																								
W.	15	9 35	8	42	8	8	9	1	8	10	5	52	6	9	6	11	6	10	3	12	9	6	3	29	6	3	29	6	3	29	6	3	29	6	3																								
Th.	16	10 19	9	18	8	11	9	36	9	0	6	29	6	11	6	48	7	0	3	45	10	0	4	21	10	0	4	21	10	0	4	21	10	0																									
F.	17	11 3	9	53	9	1	10	10	9	2	7	6	7	1	7	24	7	2	4	20	10	4	4	37	10	4	4	37	10	4	4	37	10	4																									
S.	18	11 50	10	27	9	2	10	43	9	2	7	41	7	3	7	57	7	3	4	55	10	7	5	12	10	7	5	12	10	7	5	12	10	7																									
♄.	19	oa38	10	59	9	2	11	15	9	2	8	12	7	4	8	27	7	4	5	29	10	9	5	45	10	9	5	45	10	9	5	45	10	9																									
M.	20	1 27	11	31	9	2	11	48	9	1	8	43	7	3	8	58	7	2	6	1	10	8	6	18	10	8	6	18	10	8	6	18	10	8																									
Tu.	21	2 17	—	—	0	6	9	1	9	14	7	1	9	30	6	11	6	35	10	5	6	53	10	5	6	53	10	5	6	53	10	5	6	53	10	5																							
W.	22	3 8	0	24	9	1	0	44	9	0	9	47	6	9	10	8	6	8	7	11	9	11	7	32	9	11	7	32	9	11	7	32	9	11																									
Th.	23	3 58	1	6	8	11	1	30	8	10	10	30	6	6	10	54	6	5	7	53	9	6	8	16	9	6	8	16	9	6	8	16	9	6																									
F.	24	4 49	1	56	8	9	2	22	8	8	11	24	6	3	11	55	6	0	8	41	9	2	9	9	2	9	9	2	9	9	2	9	9	2																									
S.	25	5 39	2	48	8	6	3	17	8	5	—	—	—	—	0	33	5	10	9	42	8	10	10	17	10	10	17	10	10	17	10	10	17	10	10																								
♄.	26	6 29	3	49	8	4	4	23	8	4	1	12	5	10	1	55	5	10	10	53	8	9	11	31	11	31	11	31	11	31	11	31	11	31																									
M.	27	7 20	4	58	8	4	5	33	8	4	2	35	6	0	3	11	6	2	—	—	—	—	0	6	—	—	—	—	—	—	—	—	—	—																									
Tu.	28	8 13	6	6	8	4	6	39	8	5	3	41	6	5	4	9	6	8	0	40	9	1	1	13	9	1	1	13	9	1	1	13	9	1																									
W.	29	9 8	7	12	8	7	7	43	8	9	4	35	6	11	4	58	7	1	1	46	9	7	2	15	9	7	2	15	9	7	2	15	9	7																									
Th.	30	10 5	8	10	8	11	8	36	9	2	5	21	7	3	5	46	7	6	2	41	10	3	3	6	10	3	3	6	10	3	3	6	10	3																									
Half Mean Spring Range.							4 ft. 9 in.								3 ft. 10 in.								5 ft. 7 in.																																				
Phases of the Moon.																														Moon's Declination at Noon.																													
D. H. M.																														M.D. ° ' M.D.																													

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
**BELFAST** subtract 3 m.      **LONDONDERRY** add 4 m.      **SLIGO BAY** add 9 m.

## NOVEMBER, 1865.

GALWAY.				QUEENSTOWN.				WATERFORD.				C's AGE AT NOON.											
MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.													
mc.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.												
M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	D.											
19	14	1	2	43	14	8	2	36	11	3	3	2	11	7	2	51	12	0	3	20	12	5	12.8
6	15	2	3	30	15	7	3	28	12	0	3	54	12	3	3	47	12	9	4	15	13	0	13.8
55	15	11	4	18	16	2	4	18	12	6	4	43	12	8	4	41	13	2	5	6	13	3	0
42	16	3	5	6	16	2	5	9	12	9	5	33	12	8	5	30	13	4	5	53	13	4	15.8
30	16	0	5	54	15	9	5	57	12	7	6	20	12	5	6	17	13	3	6	41	13	1	16.8
18	15	4	6	42	14	10	6	43	12	1	7	6	11	9	7	4	12	11	7	27	12	8	17.8
5	14	3	7	29	13	8	7	28	11	5	7	50	11	0	7	48	12	4	8	9	12	0	18.8
55	13	1	8	22	12	5	8	12	10	8	8	35	10	3	8	30	11	8	8	52	11	3	19.8
49	11	10	9	19	11	4	9	0	9	11	9	25	9	7	9	15	10	11	9	42	10	7	20.8
53	10	11	10	29	10	10	9	54	9	3	10	28	9	2	10	15	10	2	10	49	10	0	21.8
6	10	9	11	43	10	10	11	4	9	0	11	41	9	0	11	23	9	10	11	56	9	9	22.8
—	—	—	0	18	11	0	—	—	—	—	0	17	9	1	—	—	—	—	0	29	9	10	23.8
50	11	3	1	18	11	6	0	51	9	3	1	25	9	6	1	1	10	0	1	33	10	2	24.8
42	11	10	2	4	12	2	1	53	9	8	2	19	9	10	2	3	10	5	2	31	10	8	25.8
26	12	5	2	47	12	9	2	43	10	1	3	5	10	4	2	57	10	11	3	21	11	1	26.8
5	12	11	3	22	13	2	3	24	10	6	3	43	10	8	3	42	11	3	4	2	11	5	27.8
40	13	5	3	57	13	7	4	2	10	10	4	20	11	0	4	23	11	7	4	43	11	8	28.8
14	13	9	4	30	13	11	4	38	11	1	4	55	11	2	5	1	11	9	5	18	11	9	29.8
47	14	0	5	4	14	0	5	13	11	3	5	31	11	3	5	33	11	10	5	51	11	11	30.8
21	14	0	5	39	13	11	5	48	11	3	6	5	11	2	6	9	11	11	6	26	11	10	31.8
56	13	10	6	13	13	7	6	22	11	1	6	39	11	0	6	43	11	10	7	0	11	9	32.8
33	13	5	6	54	12	3	6	58	10	10	7	18	10	8	7	18	11	9	7	38	11	7	33.8
16	12	11	7	40	12	9	7	39	10	6	7	59	10	5	7	58	11	6	8	18	11	5	34.8
4	12	5	8	29	12	0	8	20	10	3	8	42	10	0	8	38	11	3	8	58	11	0	35.8
58	11	9	9	28	11	6	9	7	9	10	9	33	9	8	9	22	10	10	9	51	10	8	36.8
2	11	5	10	39	11	6	10	2	9	7	10	38	9	7	10	25	10	6	10	59	10	5	37.8
17	11	8	11	52	11	11	11	14	9	8	11	50	9	9	11	32	10	5	—	—	—	—	38.8
—	—	—	0	25	12	3	0	25	10	0	—	—	—	—	0	4	10	6	0	35	10	9	39.8
57	12	8	1	26	13	2	1	1	10	3	1	35	10	6	1	9	11	0	1	44	11	4	40.8
53	13	7	2	20	14	0	2	7	10	10	2	37	11	2	2	18	11	8	2	52	11	11	41.8
Mean Spring } 7ft. 5in.				5ft. 10in.				6ft. 2in.															

## Equation of Time at Noon.

L. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.
5 17		9	16	1	17	14	49	25	12	45
5 18		10	15	55	18	14	36	26	12	26
5 18		11	15	48	19	14	23	27	12	6
5 17		12	15	40	20	14	8	28	11	45
5 16		13	15	32	21	13	53	29	11	24
5 13		14	15	22	22	13	37	30	11	3
5 10		15	15	12	23	13	20			
5 6		16	15	1	24	13	3			

High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for GALWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## TIDE TABLES FOR THE

DECEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BREST.						DEVONPORT.						PORTSMOUTH.											
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
			Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.							
		H. M.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.	H. M. F. I.							
F.	1	11 a 5	1 57 18 8	2 22 19 3	3 46 15 1	4 14 15 6	9 52 12 7	10 18 12 10	10 44 13 0	11 9 13 2	11 58 13 2	12 27 13 5	1 10 14 1	1 39 14 4	2 8 14 7	2 37 14 10	3 6 14 13	3 35 14 16	4 4 14 19							
S.	2	morn.	2 47 19 9	3 13 20 0	4 41 15 8	5 7 15 11	10 44 13 0	11 9 13 2	11 58 13 2	12 27 13 5	1 10 14 1	1 39 14 4	2 8 14 7	2 37 14 10	3 6 14 13	3 35 14 16	4 4 14 19	4 43 14 22	5 12 14 25							
☾	3	0 5	3 38 20 2	4 22 20 2	5 33 16 1	5 58 16 0	11 33 13 2	11 58 13 2	12 27 13 5	1 10 14 1	1 39 14 4	2 8 14 7	2 37 14 10	3 6 14 13	3 35 14 16	4 4 14 19	4 43 14 22	5 12 14 25	5 41 14 28							
M.	4	1 5	4 26 20 1	4 48 19 10	6 22 16 3	6 45 15 10	—	—	—	—	—	—	—	—	—	—	—	—	—							
Tu.	5	2 3	5 11 19 6	5 32 19 1	7 6 16 1	7 26 15 5	0 47 13 0	1 10 12 10	1 39 14 4	2 8 14 7	2 37 14 10	3 6 14 13	3 35 14 16	4 4 14 19	4 43 14 22	5 12 14 25	5 41 14 28	6 10 14 31	6 39 14 34							
W.	6	2 58	5 54 18 7	6 16 18 0	7 47 15 8	8 8 14 9	1 33 12 8	1 55 12 8	2 40 11 11	3 29 11 4	4 18 10 7	5 7 9 10	5 56 8 13	6 45 7 16	7 34 6 19	8 23 5 22	9 12 4 25	10 0 3 28	10 49 2 31							
Th.	7	3 50	6 39 17 4	7 2 16 9	8 28 15 0	8 47 13 11	2 17 12 2	2 40 11 11	3 29 11 4	4 18 10 7	5 7 9 10	5 56 8 13	6 45 7 16	7 34 6 19	8 23 5 22	9 12 4 25	10 0 3 28	10 49 2 31	11 38 1 34							
F.	8	4 38	7 26 16 0	7 49 15 4	9 7 14 1	9 28 13 0	3 2 11 7	3 25 11 4	4 10 10 9	5 0 10 2	5 49 9 11	6 38 8 14	7 27 7 17	8 16 6 20	9 5 5 23	9 54 4 26	10 43 3 29	11 32 2 32	12 21 1 35							
S.	9	5 23	8 13 14 10	8 39 14 3	9 50 13 2	10 14 12 4	3 47 11 0	4 10 10 9	5 0 10 2	5 49 9 11	6 38 8 14	7 27 7 17	8 16 6 20	9 5 5 23	9 54 4 26	10 43 3 29	11 32 2 32	12 21 1 35	1 10 1 38							
☾	10	6 7	9 5 13 11	9 36 13 9	10 39 12 6	11 5 11 10	4 35 10 6	5 0 10 2	5 49 9 11	6 38 8 14	7 27 7 17	8 16 6 20	9 5 5 23	9 54 4 26	10 43 3 29	11 32 2 32	12 21 1 35	1 10 1 38	1 39 1 41							
M.	11	6 50	10 10 13 7	10 48 13 7	11 37 12 2	—	5 29 10 1	6 2 9 11	6 41 8 13	7 30 7 16	8 19 6 19	9 8 5 22	9 57 4 25	10 46 3 28	11 35 2 31	12 24 1 34	1 13 1 37	2 2 1 40	2 51 1 43							
Tu.	12	7 32	11 22 13 9	11 55 13 11	0 12 11 11	0 49 12 4	6 37 9 11	7 10 10 0	7 41 8 13	8 30 6 16	9 19 5 19	10 8 4 22	10 57 3 25	11 46 2 28	12 35 1 31	1 24 1 34	2 13 1 37	3 2 1 40	3 51 1 43							
W.	13	8 15	—	0 25 14 2	1 23 12 4	1 54 12 8	7 42 10 2	8 14 10 4	8 13 7 16	9 2 6 19	10 11 5 22	10 50 4 25	11 39 3 28	12 28 2 31	1 17 2 34	2 6 2 37	3 15 2 40	4 4 2 43	5 33 2 46							
Th.	14	8 59	0 54 14 7	1 20 15 0	2 25 12 9	2 53 13 1	8 45 10 7	9 11 10 10	9 10 7 16	10 19 6 19	11 8 5 22	11 57 4 25	12 46 3 28	1 35 2 31	2 24 2 34	3 13 2 37	4 2 2 40	5 11 2 43	6 0 2 46							
F.	15	9 45	1 42 15 6	2 2 16 0	3 20 13 4	3 44 13 7	9 34 11 1	10 56 11 8	10 33 7 16	11 42 6 19	12 31 5 22	1 20 4 25	2 9 3 28	3 0 2 31	4 0 2 34	5 0 2 37	6 0 2 40	7 0 2 43	7 59 2 46							
S.	16	10 33	2 21 16 5	2 40 16 11	4 8 13 10	4 30 14 0	10 16 11 6	12 0 11 8	11 42 6 19	12 51 5 22	1 40 4 25	2 29 3 28	3 18 2 31	4 7 2 34	5 0 2 37	6 0 2 40	7 0 2 43	8 0 2 46	8 59 2 49							
☾	17	11 22	2 59 17 4	3 19 17 8	4 51 14 5	5 11 14 5	10 55 11 10	1 0 12 0	12 51 5 22	1 40 4 25	2 29 3 28	3 18 2 31	4 7 2 34	5 0 2 37	6 0 2 40	7 0 2 43	8 0 2 46	9 0 2 49	9 59 2 52							
M.	18	0 a 13	3 37 17 10	3 56 18 0	5 30 14 10	5 49 14 7	11 33 12 0	1 0 12 0	1 40 4 25	2 29 3 28	3 18 2 31	4 7 2 34	5 0 2 37	6 0 2 40	7 0 2 43	8 0 2 46	9 0 2 49	10 0 2 52	10 59 2 55							
Tu.	19	1 4	4 16 18 1	4 34 18 2	6 8 15 2	6 27 14 9	—	—	0 12 12 4	1 1 12 7	2 0 12 10	3 0 12 13	4 0 12 16	5 0 12 19	6 0 12 22	7 0 12 25	8 0 12 28	9 0 12 31	10 0 12 34							
W.	20	1 55	4 52 18 3	5 11 18 3	6 45 15 3	7 2 14 8	0 32 12 2	0 53 12 2	1 2 12 5	2 1 12 8	3 1 12 11	4 1 12 14	5 1 12 17	6 1 12 20	7 1 12 23	8 1 12 26	9 1 12 29	10 1 12 32	11 0 12 35							
Th.	21	2 46	5 30 18 2	5 49 18 1	7 20 15 2	7 39 14 6	1 11 12 2	1 31 12 2	2 2 12 5	3 1 12 8	4 1 12 11	5 1 12 14	6 1 12 17	7 1 12 20	8 1 12 23	9 1 12 26	10 1 12 29	11 0 12 32	12 0 12 35							
F.	22	3 37	6 9 17 11	6 30 17 8	7 58 15 0	8 18 14 3	1 50 12 2	2 10 12 1	3 2 12 5	4 1 12 8	5 1 12 11	6 1 12 14	7 1 12 17	8 1 12 20	9 1 12 23	10 1 12 26	11 0 12 29	12 0 12 32	1 0 12 35							
S.	23	4 27	6 52 17 4	7 16 16 11	8 38 14 7	8 59 13 9	2 31 12 0	2 53 11 10	3 6 12 13	4 5 12 16	5 5 12 19	6 5 12 22	7 5 12 25	8 5 12 28	9 5 12 31	10 5 12 34	11 5 12 37	12 5 12 40	1 5 12 43							
☾	24	5 17	7 41 16 6	8 6 16 1	9 22 14 2	9 47 13 5	3 16 11 9	3 40 11 7	4 6 12 16	5 5 12 19	6 5 12 22	7 5 12 25	8 5 12 28	9 5 12 31	10 5 12 34	11 5 12 37	12 5 12 40	1 5 12 43	2 5 12 46							
M.	25	6 7	8 33 15 8	9 3 15 4	10 13 13 8	10 42 13 1	4 4 11 4	4 30 11 4	5 6 12 17	6 5 12 20	7 5 12 23	8 5 12 26	9 5 12 29	10 5 12 32	11 5 12 35	12 5 12 38	1 5 12 41	2 5 12 44	3 5 12 47							
Tu.	26	7 0	9 35 15 2	10 11 15 2	11 12 13 3	11 45 12 11	4 59 11 0	5 29 10 10	6 6 12 17	7 5 12 20	8 5 12 23	9 5 12 26	10 5 12 29	11 5 12 32	12 5 12 35	1 5 12 38	2 5 12 41	3 5 12 44	4 5 12 47							
W.	27	7 54	10 49 15 3	11 29 15 5	—	0 24 13 3	5 3 10 9	6 38 10 8	6 13 12 17	7 6 12 20	8 5 12 23	9 5 12 26	10 5 12 29	11 5 12 32	12 5 12 35	1 5 12 38	2 5 12 41	3 5 12 44	4 5 12 47							
Th.	28	8 50	—	0 7 15 9	1 3 13 3	1 43 13 7	7 17 10 10	7 55 11 2	7 18 12 17	8 6 12 20	9 5 12 23	10 5 12 26	11 5 12 29	12 5 12 32	1 5 12 35	2 5 12 38	3 5 12 41	4 5 12 44	5 5 12 47							
F.	29	9 48	0 41 16 3	1 14 16 9	2 21 13 9	2 55 14 1	8 31 11 5	9 5 11 9	8 19 12 17	9 6 12 20	10 5 12 23	11 5 12 26	12 5 12 29	1 5 12 32	2 5 12 35	3 5 12 38	4 5 12 41	5 5 12 44	6 5 12 47							
S.	30	10 47	1 42 17 4	2 10 18 0	3 28 14 5	3 57 14 8	9 36 12 0	10 5 12 9	9 28 12 17	10 6 12 20	11 5 12 23	12 5 12 26	1 5 12 29	2 5 12 32	3 5 12 35	4 5 12 38	5 5 12 41	6 5 12 44	7 5 12 47							
☾	31	11 46	2 36 18 6	3 0 19 0	4 25 15 2	4 53 15 2	10 32 12 5	11 5 12 9	10 29 12 17	11 6 12 20	12 5 12 23	1 5 12 26	2 5 12 29	3 5 12 32	4 5 12 35	5 5 12 38	6 5 12 41	7 5 12 44	8 5 12 47							
Half Mean Spring Range.			9ft. 6in.						7ft. 9in.						6ft. 4in.											
Phases of the Moon.			Moon's Declination at Noon.																							
D. H. M.			M.D.						M.D.						M.D.						M.D.					
Full - - - - 2 6 44 Afternoon.			1 15 N. 34						9 4 N. 15						17 18 s. 35						25 2 N. 32					
Last Quarter - 10 0 13 Morning.			2 17 44						10 0 24						18 18 40						26 6 55					
New - - - - 18 4 45 Morning.			3 18 41						11 3 s. 24						19 17 50						27 10 57					
First Quarter - 25 0 31 Afternoon.			4 18 22						12 7 3						20 16 5						28 14 22					
			5 16 56						13 10 25						21 13 28						29 16 50					
In Perigee - - 1 4 0 Morning.			6 14 34						14 13 23						22 10 7						30 18 24					
In Apogee - - 13 3 0 Morning.			7 11 31						15 15 49						23 6 12						31 18 41					
In Perigee - - 29 3 0 Morning.			8 8 0						16 17 36						24 1 55											

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, — for  
 BREST add 18 m.      DEVONPORT add 17 m.      PORTSMOUTH add 4 m.

## DECEMBER, 1865.

DOVER.						SHEERNESS.						LONDON.						C's Age at Noon.
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			
Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		Time. H. M. F. I.	Height. F. I.		
9 15 18 5			9 42 18 10			11 4 15 9			11 30 16 1			0 5 18 0			0 33 18 4			13 0
10 10 19 2			10 38 19 5			11 55 16 4			—			1 1 18 9			1 26 19 1			0
11 5 19 6			11 31 19 6			0 20 16 7			0 46 16 8			1 50 19 5			2 14 19 7			15 0
11 57 19 5			—			1 10 16 9			1 34 16 9			2 39 19 9			3 3 19 10			16 0
0 22 19 3			0 47 19 1			1 57 16 8			2 19 16 6			3 26 19 10			3 49 19 8			17 0
1 11 18 10			1 35 18 6			2 41 16 4			3 2 16 1			4 11 19 6			4 34 19 3			18 0
1 58 18 1			2 21 17 7			3 24 15 9			3 46 15 5			4 55 18 11			5 17 18 7			19 0
2 43 17 1			3 6 16 7			4 9 15 0			4 32 14 7			5 39 18 3			6 2 17 10			20 0
3 28 16 1			3 51 15 8			4 56 14 3			5 20 13 11			6 26 17 5			6 50 17 0			21 0
4 14 15 2			4 37 14 9			5 46 13 8			6 15 13 4			7 15 16 8			7 41 16 4			22 0
5 4 14 6			5 33 14 4			6 44 13 1			7 16 13 0			8 11 16 1			8 45 15 11			23 0
6 4 14 3			6 36 14 5			7 52 13 0			8 29 13 1			9 19 15 10			9 54 15 9			24 0
7 8 14 8			7 40 14 11			9 1 13 3			9 33 13 6			10 27 15 10			11 0 15 11			25 0
8 10 15 3			8 35 15 7			10 2 13 9			10 30 13 11			11 29 16 1			11 56 16 3			26 0
8 57 15 11			9 19 16 3			10 54 14 1			11 16 14 4			—			0 22 16 6			27 0
9 40 16 7			10 1 16 11			11 35 14 7			11 54 14 9			0 45 16 9			1 5 17 1			28 0
10 22 17 2			10 43 17 5			—			0 13 15 0			1 25 17 4			1 44 17 7			29 0
11 3 17 7			11 24 17 9			0 32 15 2			0 51 15 4			2 4 17 10			2 21 18 1			30 0
11 45 17 10			—			1 10 15 5			1 28 15 6			2 40 18 3			2 58 18 5			1 3
0 6 18 0			0 26 18 1			1 47 15 7			2 5 15 7			3 16 18 7			3 33 18 8			2 3
0 46 18 1			1 7 18 1			2 24 15 7			2 42 15 7			3 51 18 9			4 10 18 9			3 3
1 29 18 0			1 50 17 11			3 0 15 6			3 19 15 5			4 30 18 8			4 50 18 7			4 3
2 12 17 9			2 34 17 7			3 39 15 4			4 1 15 2			5 11 18 6			5 32 18 4			5 3
2 57 17 3			3 21 17 0			4 23 15 0			4 46 14 9			5 55 18 2			6 17 17 11			6 3
3 45 16 8			4 11 16 4			5 11 14 6			5 37 14 4			6 42 17 8			7 8 17 6			7 3
4 38 16 0			5 5 15 8			6 7 14 1			6 41 13 11			7 36 17 3			8 7 17 0			8 3
5 35 15 7			6 7 15 10			7 15 13 10			7 52 13 10			8 42 16 11			9 19 16 10			9 3
6 43 16 1			7 21 16 2			8 30 14 0			9 8 14 3			9 56 16 9			10 34 16 11			10 3
7 56 16 7			8 29 17 0			9 44 14 6			10 17 14 10			11 10 17 1			11 44 17 4			11 3
8 59 17 5			9 28 17 10			10 48 15 2			11 16 15 5			—			0 15 17 8			12 3
9 56 18 3			10 24 18 6			11 43 15 8			—			0 44 18 0			1 11 18 4			13 3
Mean Spring } Range.			9ft. 4in.			8ft. 0in.						9ft. 7in.						

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
10 40		9	7 20		17	3 32		25	0 28	
10 17		10	6 53		18	3 2		26	0 58	
9 54		11	6 25		19	2 32		27	1 27	
9 29		12	5 57		20	2 2		28	1 57	
9 5		13	5 28		21	1 32		29	2 26	
8 39		14	5 0		22	1 2		30	2 55	
8 13		15	4 30		23	0 32		31	3 24	
7 47		16	4 1		24	0 2				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 Dover subtract 5 m.      SHEERNESS subtract 3 m.      LONDON 0 m.

## TIDE TABLES FOR THE

DECEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	HARWICH.								HULL.								SUNDERLAND.							
			MORNING.				AFTERNOON.				MORNING.				AFTERNOON.				MORNING.				AFTERNOON.			
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.						
F.	1	11 35	10 14	11 5	10 41	11 8	4 32	20 5	4 58	20 11	1 25	13 10	1 53	14 4	1 53	14 4	1 53	14 4	1 53	14 4	1 53	14 4	1 53	14 4	1 53	14 4
S.	2	morn.	11 7	11 10	11 33	12 0	5 23	21 3	5 50	21 6	2 19	14 5	2 44	14 4	2 44	14 4	2 44	14 4	2 44	14 4	2 44	14 4	2 44	14 4	2 44	14 4
S.	3	0 5	11 58	12 1	—	—	6 16	21 8	6 41	21 10	3 8	14 10	3 33	15 4	3 33	15 4	3 33	15 4	3 33	15 4	3 33	15 4	3 33	15 4	3 33	15 4
M.	4	1 5	0 22	12 1	0 46	12 0	7 6	21 10	7 30	21 9	3 57	15 1	4 20	15 4	4 20	15 4	4 20	15 4	4 20	15 4	4 20	15 4	4 20	15 4	4 20	15 4
Tu.	5	2 3	1 10	11 11	1 33	11 9	7 52	21 6	8 14	21 3	4 42	14 11	5 4	14 4	5 4	14 4	5 4	14 4	5 4	14 4	5 4	14 4	5 4	14 4	5 4	14 4
W.	6	2 58	1 56	11 7	2 19	11 5	8 37	20 10	9 0	20 4	5 27	14 3	5 51	13 2	5 51	13 2	5 51	13 2	5 51	13 2	5 51	13 2	5 51	13 2	5 51	13 2
Th.	7	3 50	2 42	11 2	3 4	11 0	9 22	19 10	9 44	19 3	6 14	13 5	6 38	13 2	6 38	13 2	6 38	13 2	6 38	13 2	6 38	13 2	6 38	13 2	6 38	13 2
F.	8	4 38	3 27	10 9	3 49	10 7	10 7	18 9	10 32	18 2	7 3	12 9	7 28	12 4	7 28	12 4	7 28	12 4	7 28	12 4	7 28	12 4	7 28	12 4	7 28	12 4
S.	9	5 23	4 11	10 4	4 34	10 2	10 58	17 8	11 28	17 3	7 53	11 11	8 18	11 4	8 18	11 4	8 18	11 4	8 18	11 4	8 18	11 4	8 18	11 4	8 18	11 4
S.	10	6 7	4 59	10 0	5 25	9 10	11 59	16 9	—	—	8 46	11 4	9 15	11 4	9 15	11 4	9 15	11 4	9 15	11 4	9 15	11 4	9 15	11 4	9 15	11 4
M.	11	6 50	5 51	9 9	6 22	9 8	0 29	16 5	0 59	16 3	9 47	11 0	10 21	10 4	10 21	10 4	10 21	10 4	10 21	10 4	10 21	10 4	10 21	10 4	10 21	10 4
Tu.	12	7 32	7 0	9 8	7 37	9 9	1 30	16 2	2 1	16 3	10 55	10 11	11 26	11 4	11 26	11 4	11 26	11 4	11 26	11 4	11 26	11 4	11 26	11 4	11 26	11 4
W.	13	8 15	8 9	9 10	8 40	9 11	2 32	16 5	3 2	16 9	11 54	11 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Th.	14	8 59	9 10	10 0	9 37	10 2	3 31	17 2	3 59	17 6	0 22	11 5	0 49	11 4	0 49	11 4	0 49	11 4	0 49	11 4	0 49	11 4	0 49	11 4	0 49	11 4
F.	15	9 45	10 3	10 4	10 26	10 6	4 23	17 11	4 45	18 3	1 13	12 0	1 35	12 4	1 35	12 4	1 35	12 4	1 35	12 4	1 35	12 4	1 35	12 4	1 35	12 4
S.	16	10 33	10 46	10 8	11 6	10 10	5 4	18 7	5 22	18 11	1 57	12 6	2 17	12 4	2 17	12 4	2 17	12 4	2 17	12 4	2 17	12 4	2 17	12 4	2 17	12 4
S.	17	11 22	11 26	11 0	11 45	11 1	5 41	19 2	6 1	19 5	2 38	13 0	2 57	13 4	2 57	13 4	2 57	13 4	2 57	13 4	2 57	13 4	2 57	13 4	2 57	13 4
M.	18	0 13	—	—	0 5	11 3	6 21	19 7	6 41	19 9	3 15	13 4	3 33	13 4	3 33	13 4	3 33	13 4	3 33	13 4	3 33	13 4	3 33	13 4	3 33	13 4
Tu.	19	1 4	0 23	11 2	0 41	11 3	7 0	19 11	7 19	20 0	3 52	13 8	4 10	13 4	4 10	13 4	4 10	13 4	4 10	13 4	4 10	13 4	4 10	13 4	4 10	13 4
W.	20	1 55	1 0	11 3	1 20	11 3	7 38	20 1	7 57	20 2	4 28	13 11	4 47	13 4	4 47	13 4	4 47	13 4	4 47	13 4	4 47	13 4	4 47	13 4	4 47	13 4
Th.	21	2 46	1 38	11 2	1 57	11 2	8 15	20 2	8 35	20 1	5 5	13 10	5 25	13 4	5 25	13 4	5 25	13 4	5 25	13 4	5 25	13 4	5 25	13 4	5 25	13 4
F.	22	3 37	2 17	11 1	2 37	11 0	8 54	19 11	9 15	19 9	5 45	13 6	6 0	13 4	6 0	13 4	6 0	13 4	6 0	13 4	6 0	13 4	6 0	13 4	6 0	13 4
S.	23	4 27	2 57	10 11	3 18	10 10	9 37	19 6	9 59	19 2	6 28	13 3	6 52	13 4	6 52	13 4	6 52	13 4	6 52	13 4	6 52	13 4	6 52	13 4	6 52	13 4
S.	24	5 17	3 40	10 9	4 2	10 8	10 22	18 11	10 47	18 7	7 17	12 10	7 43	12 4	7 43	12 4	7 43	12 4	7 43	12 4	7 43	12 4	7 43	12 4	7 43	12 4
M.	25	6 7	4 26	10 6	4 51	10 5	11 16	18 4	11 50	18 0	8 10	12 5	8 39	12 4	8 39	12 4	8 39	12 4	8 39	12 4	8 39	12 4	8 39	12 4	8 39	12 4
Tu.	26	7 0	5 19	10 4	5 49	10 3	—	—	0 26	17 9	9 12	12 0	9 46	11 4	9 46	11 4	9 46	11 4	9 46	11 4	9 46	11 4	9 46	11 4	9 46	11 4
W.	27	7 54	6 21	10 3	6 59	10 3	0 59	17 6	1 32	17 6	10 21	11 10	10 57	11 4	10 57	11 4	10 57	11 4	10 57	11 4	10 57	11 4	10 57	11 4	10 57	11 4
Th.	28	8 50	7 38	10 4	8 16	10 6	2 5	17 7	2 39	17 11	11 33	12 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
F.	29	9 48	8 51	10 8	9 24	10 10	3 13	18 6	3 45	19 0	0 5	12 5	0 36	12 4	0 36	12 4	0 36	12 4	0 36	12 4	0 36	12 4	0 36	12 4	0 36	12 4
S.	30	10 47	9 57	11 0	10 27	11 3	4 17	19 6	4 45	19 11	1 7	13 1	1 37	13 4	1 37	13 4	1 37	13 4	1 37	13 4	1 37	13 4	1 37	13 4	1 37	13 4
S.	31	11 46	10 55	11 5	11 22	11 7	5 11	20 4	5 37	20 7	2 6	13 9	2 34	14 4	2 34	14 4	2 34	14 4	2 34	14 4	2 34	14 4	2 34	14 4	2 34	14 4
Half Mean Spring Range.			5 ft. 9 in.				10 ft. 5 in.				7 ft. 2 in.															
Phases of the Moon.												Moon's Declination at Noon.														
D. H. M.												M.D. ° ' "														
Full	-	-	2	6	44	Afternoon.						1	15	N. 34	9	4	N. 15	17	18	S. 35	25	2	S. 5			
Last Quarter	-	-	10	0	13	Morning.						2	17	44	10	0	24	18	18	40	26	6	S.			
New	-	-	18	4	45	Morning.						3	18	41	11	3	S. 24	19	17	50	27	10	S.			
First Quarter	-	-	25	0	31	Afternoon.						4	18	22	12	7	3	20	16	5	28	14	S.			
In Perigee	-	-	1	4	0	Morning.						5	16	56	13	10	25	21	13	28	29	16	S.			
In Apogee	-	-	13	3	0	Morning.						6	14	34	14	13	23	22	10	7	30	18	S.			
In Perigee	-	-	29	3	0	Morning.						7	11	31	15	15	49	23	6	12	31	18	S.			
												8	8	0	16	17	36	24	1	55						

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—  
 HARWICH subtract 5 m.      HULL add 1 m.      SUNDERLAND add 5 m.

## DECEMBER, 1865.

NORTH SHIELDS.										LEITH.										THURSO.										C's Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.									
L. M. F. I.	H. M. F. I.				H. M. F. I.	H. M. F. I.				H. M. F. I.	H. M. F. I.				L. H. M. F. I.	H. M. F. I.				H. M. F. I.	H. M. F. I.					D.				
1 32 12 7	1 57 13 0				0 26 15 6	0 52 16 0				6 49 12 10	7 10 13 4				7 10 13 4	7 56 14 0				7 10 13 4	7 56 14 0					13 0				
2 22 13 4	2 46 13 7				1 17 16 5	1 42 16 9				7 32 13 9	7 56 14 0				7 32 13 9	7 56 14 0				7 56 14 0	8 10 14 0					0				
3 9 13 9	3 33 13 11				2 7 17 0	2 31 17 1				8 19 14 1	8 42 14 0				8 19 14 1	8 42 14 0				8 42 14 0	9 15 14 0					15 0				
3 57 13 11	4 21 13 10				2 54 17 1	3 16 16 11				9 5 13 11	9 28 13 8				9 5 13 11	9 28 13 8				9 28 13 8	10 16 13 8					16 0				
4 44 13 7	5 8 13 4				3 39 16 8	4 2 16 5				9 52 13 4	10 15 13 0				9 52 13 4	10 15 13 0				10 15 13 0	11 0 13 0					17 0				
5 31 13 0	5 55 12 8				4 25 16 1	4 48 15 9				10 39 12 7	11 3 12 2				10 39 12 7	11 3 12 2				11 3 12 2	12 0 12 2					18 0				
5 18 12 4	6 41 12 0				5 11 15 4	5 36 14 11				11 28 11 9	11 53 11 4				11 28 11 9	11 53 11 4				11 53 11 4	12 11 11 4					19 0				
7 5 11 8	7 31 11 3				6 1 14 6	6 26 14 0				— — — —	0 18 10 10				— — — —	0 18 10 10				0 18 10 10	1 0 10 10					20 0				
7 57 10 10	8 25 10 5				6 51 13 7	7 19 13 3				0 43 10 6	1 10 10 2				0 43 10 6	1 10 10 2				1 10 10 2	2 10 10 2					21 0				
8 56 10 2	9 27 9 11				7 50 12 11	8 20 12 8				1 40 9 10	2 11 9 7				1 40 9 10	2 11 9 7				2 11 9 7	3 7 9 7					22 0				
9 0 9 10	10 33 9 10				8 52 12 6	9 27 12 6				2 44 9 6	3 23 9 5				2 44 9 6	3 23 9 5				3 23 9 5	4 5 9 5					23 0				
1 7 9 11	11 39 10 11				10 1 12 6	10 32 12 7				4 0 9 4	4 32 9 5				4 0 9 4	4 32 9 5				4 32 9 5	5 24 9 5					24 0				
— — — —	0 8 10 3				11 1 12 9	11 29 13 0				5 3 9 6	5 31 9 7				5 3 9 6	5 31 9 7				5 31 9 7	6 25 9 7					25 0				
0 36 10 5	1 1 10 7				11 57 13 3	— — — —				5 57 9 10	6 20 10 3				5 57 9 10	6 20 10 3				6 20 10 3	7 0 10 3					26 0				
1 24 10 10	1 44 11 1				0 18 13 6	0 38 13 10				6 39 10 7	6 55 11 0				6 39 10 7	6 55 11 0				6 55 11 0	7 11 11 0					27 0				
2 3 11 4	2 21 11 7				0 57 14 2	1 16 14 6				7 12 11 4	7 28 11 9				7 12 11 4	7 28 11 9				7 28 11 9	8 0 11 9					28 0				
2 40 11 10	2 58 12 1				1 36 14 10	1 55 15 1				7 45 12 1	8 2 12 4				7 45 12 1	8 2 12 4				8 2 12 4	9 0 12 4					29 0				
3 16 12 3	3 34 12 5				2 14 15 4	2 32 15 6				8 20 12 6	8 38 12 7				8 20 12 6	8 38 12 7				8 38 12 7	9 7 12 7					30 0				
3 52 12 7	4 11 12 8				2 50 15 7	3 7 15 8				8 56 12 7	9 14 12 7				8 56 12 7	9 14 12 7				9 14 12 7	10 0 12 7					31 0				
4 30 12 8	4 49 12 7				3 25 15 8	3 44 15 7				9 33 12 7	9 52 12 6				9 33 12 7	9 52 12 6				9 52 12 6	10 6 12 6					32 0				
5 8 12 6	5 28 12 5				4 3 15 6	4 23 15 5				10 13 12 5	10 34 12 3				10 13 12 5	10 34 12 3				10 34 12 3	11 0 12 3					33 0				
5 49 12 4	6 10 12 3				4 44 15 4	5 4 15 3				10 55 12 1	11 18 11 11				10 55 12 1	11 18 11 11				11 18 11 11	12 0 11 11					34 0				
5 32 12 2	6 55 12 0				5 26 15 1	5 50 14 11				11 42 11 8	— — — —				11 42 11 8	— — — —				— — — —	— — — —					35 0				
7 19 11 9	7 46 11 6				6 16 14 8	6 42 14 4				0 7 11 5	0 34 11 2				0 7 11 5	0 34 11 2				0 34 11 2	1 2 11 2					36 0				
3 15 11 3	8 46 11 0				7 10 14 1	7 42 13 10				1 1 11 0	1 32 10 10				1 1 11 0	1 32 10 10				1 32 10 10	2 10 10 10					37 0				
2 21 10 10	9 58 10 9				8 16 13 8	8 51 13 6				2 7 10 7	2 43 10 6				2 7 10 7	2 43 10 6				2 43 10 6	3 6 10 6					38 0				
0 34 10 10	11 10 10 11				9 28 13 6	10 4 13 7				3 22 10 5	4 2 10 5				3 22 10 5	4 2 10 5				4 2 10 5	5 9 10 5					39 0				
1 46 11 2	— — — —				10 39 13 9	11 12 14 1				4 39 10 6	5 14 10 8				4 39 10 6	5 14 10 8				5 14 10 8	6 10 10 8					40 0				
0 19 11 5	0 49 11 8				11 42 14 4	— — — —				5 44 11 0	6 15 11 5				5 44 11 0	6 15 11 5				6 15 11 5	7 11 11 5					41 0				
1 18 11 11	1 45 12 2				0 12 14 9	0 39 15 1				6 39 11 11	7 3 12 5				6 39 11 11	7 3 12 5				7 3 12 5	8 5 12 5					42 0				
2 11 12 6	2 36 12 10				1 5 15 6	1 32 15 11				7 25 12 10	7 47 13 2				7 25 12 10	7 47 13 2				7 47 13 2	8 2 13 2					43 0				
Mean Spring } 6ft. 8in. Range.										8ft. 2in.										6ft. 7in.										

## Equation of Time at Noon.

M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Add.	M. D.	M. S.	Sub.
10 40		9	7 20		17	3 32		25	0 28	
10 17		10	6 53		18	3 2		26	0 58	
9 54		11	6 25		19	2 32		27	1 27	
9 29		12	5 57		20	2 2		28	1 57	
9 5		13	5 28		21	1 32		29	2 26	
8 39		14	5 0		22	1 2		30	2 55	
8 13		15	4 30		23	0 32		31	3 24	
7 47		16	4 1		24	0 2				

of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 NORTH SHIELDS add 6 m.                      LEITH add 13 m.                      THURSO add 14 m.



## DECEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	GREENOCK.						LIVERPOOL.						PEMBROKE.											
			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.								
			H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.	H. M.	Time.	Height.						
F.	1	11 18 5	10	12	9	7	10	39	9	9	31	25	9	9	56	26	3	4	14	20	6	4	43	21	1	
S.	2	morn.	11	7	9	10	11	34	9	11	10	21	26	8	10	47	26	11	5	11	21	6	5	39	21	9
Mo.	3	0 5	12	0	10	0	—	—	—	—	11	13	27	2	11	37	27	2	6	4	22	0	6	28	22	1
M.	4	1 5	0	25	10	0	0	50	10	0	—	—	—	0	1	27	1	6	52	22	0	7	15	21	9	
Tu.	5	2 3	1	14	10	0	1	37	9	11	0	24	26	11	0	46	26	6	7	37	21	5	7	59	21	8
W.	6	2 58	1	59	9	10	2	21	9	8	1	8	26	0	1	30	25	4	8	22	20	0	8	44	19	21
Th.	7	3 50	2	42	9	6	3	4	9	4	1	52	24	8	2	14	24	0	9	6	19	4	9	27	18	9
F.	8	4 38	3	26	9	3	3	48	9	1	2	36	23	4	2	59	22	7	9	48	18	1	10	8	17	6
S.	9	5 23	4	10	8	11	4	34	8	9	3	22	21	11	3	46	21	4	10	29	16	11	10	51	16	4
Mo.	10	6 7	4	59	8	7	5	25	8	5	4	14	20	8	4	43	20	2	11	13	15	9	11	40	15	7
M.	11	6 50	5	55	8	3	6	28	8	2	5	16	20	0	5	53	19	11	—	—	—	0	10	15	3	3
Tu.	12	7 32	7	3	8	2	7	35	8	2	6	32	20	0	7	5	20	3	0	44	15	4	1	21	15	9
W.	13	8 15	8	7	8	3	8	37	8	4	7	36	20	6	8	6	20	10	1	56	15	8	2	29	16	8
Th.	14	8 59	9	7	8	6	9	33	8	7	8	33	21	4	8	57	21	9	3	1	16	5	3	28	16	11
F.	15	9 45	9	55	8	9	10	17	8	10	9	18	22	4	9	37	22	9	3	53	17	5	4	16	17	10
S.	16	10 33	10	37	8	11	10	58	9	0	9	56	23	3	10	15	23	7	4	39	18	4	5	2	18	9
Mo.	17	11 22	11	19	9	1	11	40	9	2	10	34	23	11	10	53	24	2	5	24	19	1	5	45	19	4
M.	18	on 13	12	0	9	3	—	—	—	—	11	12	24	6	11	32	24	8	6	4	19	7	6	23	19	14
Tu.	19	1 4	0	20	9	4	0	39	9	5	11	51	24	10	—	—	—	6	42	20	0	7	0	20	2	2
W.	20	1 55	0	59	9	6	1	18	9	6	0	10	25	0	0	29	25	1	7	19	20	2	7	38	20	2
Th.	21	2 46	1	37	9	6	1	56	9	6	0	48	25	1	1	7	25	0	7	57	20	1	8	17	20	2
F.	22	3 37	2	15	9	6	2	35	9	6	1	26	24	9	1	45	24	6	8	37	19	10	8	58	19	7
S.	23	4 27	2	56	9	5	3	17	9	4	2	6	24	3	2	28	23	11	9	19	19	3	9	40	18	11
Mo.	24	5 17	3	39	9	3	4	3	9	2	2	50	23	7	3	14	23	1	10	2	18	7	10	25	18	8
M.	25	6 7	4	27	9	1	4	54	9	0	3	38	22	9	4	7	22	4	10	49	17	10	11	14	17	4
Tu.	26	7 0	5	24	8	11	5	55	8	9	4	40	21	11	5	14	21	8	11	41	17	0	—	—	—	—
W.	27	7 54	6	29	8	8	7	4	8	7	5	52	21	8	6	33	21	10	0	11	16	11	0	45	16	11
Th.	28	8 50	7	42	8	9	8	19	8	10	7	12	22	2	7	47	22	8	1	28	17	1	2	9	17	6
F.	29	9 48	8	54	9	0	9	27	9	2	8	20	23	2	8	51	23	10	2	46	18	0	3	22	18	8
S.	30	10 47	9	57	9	3	10	26	9	5	9	18	24	5	9	45	25	0	3	55	19	3	4	27	19	10
Mo.	31	11 46	10	54	9	6	11	21	9	7	10	10	25	5	10	35	25	9	4	57	20	4	5	25	20	9
Half Mean Spring Range.			4 ft. 10 in.						13 ft. 0 in.						10 ft. 6 in.											
Phases of the Moon.												Moon's Declination at Noon.														
D. H. M.												M.D. ° ' "														
Full - - - - - 2 6 44 Afternoon.												1 15 N. 34 9 4 N. 15 17 18 S. 35 25 2 N. 34														
Last Quarter - 10 0 13 Morning.												2 17 44 10 0 24 18 18 40 26 6 53														
New - - - - - 18 4 45 Morning.												3 18 41 11 3 8. 24 19 17 50 27 10 57														
First Quarter - 25 0 31 Afternoon.												4 18 22 12 7 3 20 16 5 28 14 23														
In Perigee - - 1 4 0 Morning.												5 16 56 13 10 25 21 13 28 29 16 56														
In Apogee - - 13 3 0 Morning.												6 14 34 14 13 23 22 10 7 30 18 24														
In Perigee - - 29 3 0 Morning.												7 11 31 15 15 49 23 6 12 31 18 41														
												8 8 0 16 17 36 24 1 55														

The times of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required, —  
 GREENOCK add 19 m. | LIVERPOOL add 12 m. | PEMBROKE add 20 m.

## DECEMBER, 1865.

WESTON-SUPER-MARE.										HOLYHEAD.										KINGSTOWN.										C's Age at Noon.
MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					MORNING.					AFTERNOON.					
Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.				Time.	Height.									
L.	M.	P.	I.		H.	M.	P.	I.		L.	M.	P.	I.		L.	M.	P.	I.		H.	M.	P.	I.				D.			
4	55	36	5		5	24	37	3		8	27	15	11		8	52	16	2		9	26	10	9		9	51	11	0	13' 0	
5	52	38	0		6	20	38	5		9	16	16	5		9	41	16	7		10	14	11	3		10	37	11	3	0	
6	47	38	9		7	12	39	0		10	5	16	9		10	26	16	9		11	1	11	5		11	25	11	4	15' 0	
7	36	38	11		7	58	38	6		10	48	16	8		11	9	16	6		11	49	11	3		—	—			16' 0	
8	20	38	1		8	41	37	6		11	32	16	3		11	56	15	11		0	12	11	2		0	36	11	0	17' 0	
9	13	36	10		9	21	35	11		—	—	—	—		0	21	15	7		0	59	10	10		1	23	10	7	18' 0	
9	41	34	11		9	59	34	0		0	45	15	2		1	10	14	9		1	46	10	4		2	10	10	1	19' 0	
0	17	32	10		10	36	31	10		1	35	14	4		2	0	13	11		2	34	9	11		2	58	9	8	20' 0	
0	56	30	11		11	20	30	0		2	24	13	7		2	51	13	3		3	23	9	5		3	50	9	3	21' 0	
1	45	29	2		—	—	—			3	21	12	11		3	52	12	8		4	19	9	1		4	49	8	11	0	22' 0
0	15	28	9		0	47	28	5		4	25	12	7		5	0	12	6		5	19	8	10		5	51	8	9	23' 0	
1	22	28	5		1	56	28	6		5	34	12	7		6	6	12	9		6	22	8	10		6	53	8	11	24' 0	
2	29	28	10		3	2	29	3		6	35	12	10		7	3	13	0		7	22	9	1		7	50	9	2	25' 0	
3	35	29	10		4	5	30	6		7	29	13	3		7	53	13	6		8	18	9	4		8	45	9	6	26' 0	
4	31	31	3		4	56	32	1		8	14	13	10		8	33	14	1		9	8	9	8		9	30	9	9	27' 0	
5	20	32	9		5	43	33	6		8	51	14	4		9	9	14	7		9	50	9	11		10	9	10	1	28' 0	
6	5	34	1		6	26	34	6		9	28	14	9		9	47	15	0		10	27	10	3		10	44	10	4	29' 0	
6	46	34	10		7	6	35	3		10	5	15	1		10	22	15	3		11	2	10	6		11	26	10	7	0	30' 0
7	26	35	8		7	45	35	10		10	39	15	4		10	56	15	5		11	38	10	7		11	59	10	7	1' 3	
8	3	36	0		8	20	36	0		11	14	15	5		11	33	15	5		—	—	—			0	17	10	7	2' 3	
8	38	36	0		8	57	35	11		11	53	15	4		—	—	—			0	37	10	6		0	57	10	6	3' 3	
9	15	35	9		9	34	35	4		0	15	15	3		0	37	15	1		1	18	10	5		1	39	10	4	4' 3	
9	53	34	10		10	12	34	4		1	0	14	11		1	24	14	9		2	1	10	2		2	24	10	1	5' 3	
10	31	33	8		10	52	33	0		1	49	14	6		2	15	14	3		2	49	10	0		3	14	9	10	6' 3	
11	16	32	4		11	44	31	8		2	42	14	1		3	13	13	10		3	40	9	9		4	12	9	7	7' 3	
—	—	—			0	15	31	2		3	48	13	8		4	24	13	6		4	46	9	5		5	19	9	4	8' 3	
0	48	30	11		1	24	31	0		5	1	13	7		5	37	13	8		5	52	9	4		6	26	9	5	9' 3	
2	31	31	3		2	42	31	10		6	12	13	11		6	46	14	2		7	0	9	7		7	33	9	9	10' 3	
3	21	32	6		3	59	33	5		7	17	14	5		7	47	14	9		8	6	9	11		8	39	10	2	11' 3	
4	34	34	4		5	8	35	4		8	14	15	1		8	40	15	5		9	10	10	4		9	39	10	6	12' 3	
5	38	36	1		6	6	36	9		9	5	15	8		9	29	15	11		10	5	10	8		10	28	10	10	13' 3	
Mean Spring Range.					18 ft. 7 in.					8 ft. 0 in.					5 ft. 6 in.															

## Equation of Time at Noon.

M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
10 40		9	7 20		17	3 32		25	0 28	
10 17		10	6 53		18	3 2		26	0 58	
9 54		11	6 25		19	2 32		27	1 27	
9 29		12	5 57		20	2 2		28	1 57	
9 5		13	5 28		21	1 32		29	2 26	
8 39		14	5 0		22	1 2		30	2 55	
8 13		15	4 30		23	0 32		31	3 24	
7 47		16	4 1		24	0 2				

s of High Water are given for Mean Time at Place; if Greenwich or Railway Time be required,—for  
 WEST-SUPER-MARE add 12 m. | HOLYHEAD add 12 m. | KINGSTOWN subtract 1 m. for Dublin Time.



## DECEMBER, 1865.

WEEK DAY.	MONTH DAY.	MOON'S TRANSIT.	BELFAST.				LONDONDERRY.				SLIGO BAY.						
			MORNING.		AFTERNOON.		MORNING.		AFTERNOON.		MORNING.		AFTERNOON.				
			Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.	Time.	Height.			
F.	1	11 18 5	9 2	9 5	9 27	9 7	6 12	7 8	6 38	7 10	3 29	10 11	3 53	4 44			
S.	2	morn.	9 52	9 8	10 16	9 9	7 4	8 0	7 30	8 1	4 18	11 6	4 34	5 25			
Mo.	3	0 5	10 40	9 9	11 4	9 9	7 54	8 2	8 17	8 2	5 10	11 9	5 34	6 25			
M.	4	1 5	11 26	9 8	11 48	9 7	8 38	8 1	8 59	7 11	5 56	11 9	6 18	7 9			
Tu.	5	2 3	—	—	0 11	9 6	9 20	7 8	9 41	7 6	6 41	11 3	7 4	8 0			
W.	6	2 58	0 35	9 5	1 0	9 4	10 3	7 3	10 25	7 0	7 26	10 7	7 48	8 39			
Th.	7	3 50	1 25	9 2	1 50	9 2	10 49	6 9	11 16	6 6	8 11	9 10	8 35	9 26			
F.	8	4 38	2 15	8 10	2 41	8 8	11 46	6 3	—	—	9 2	9 3	9 29	10 20			
S.	9	5 23	3 6	8 6	3 33	8 4	0 18	5 11	0 52	5 9	9 59	8 8	10 30	11 21			
Mo.	10	6 7	4 1	8 3	4 30	8 2	1 27	5 8	2 4	5 7	11 1	8 4	11 33	12 24			
M.	11	6 50	5 0	8 1	5 32	8 0	2 37	5 7	3 10	5 9	—	—	0 5	1 16			
Tu.	12	7 32	6 5	8 0	6 37	8 0	3 41	5 10	4 9	6 0	0 39	8 3	1 11	2 2			
W.	13	8 15	7 8	8 0	7 37	8 1	4 34	6 1	4 57	6 3	1 41	8 6	2 9	3 0			
Th.	14	8 59	8 4	8 2	8 27	8 4	5 19	6 4	5 39	6 5	2 36	8 10	2 58	3 49			
F.	15	9 45	8 47	8 6	9 7	8 8	5 58	6 7	6 17	6 8	3 18	9 4	3 35	4 26			
S.	16	10 33	9 26	8 10	9 45	8 11	6 36	6 10	6 56	6 11	3 53	9 10	4 11	5 2			
Mo.	17	11 22	10 4	9 0	10 23	9 1	7 17	7 0	7 36	7 2	4 30	10 3	4 49	5 40			
M.	18	0 13	10 41	9 2	10 59	9 2	7 55	7 3	8 13	7 4	5 9	10 7	5 29	6 1			
Tu.	19	1 4	11 17	9 2	11 34	9 2	8 30	7 4	8 47	7 4	5 47	10 9	6 4	7 2			
W.	20	1 55	11 52	9 3	—	—	9 4	7 4	9 21	7 3	6 22	10 9	6 42	7 13			
Th.	21	2 46	0 12	9 3	0 33	9 3	9 39	7 2	9 58	7 2	7 2	10 7	7 22	8 3			
F.	22	3 37	0 54	9 2	1 16	9 2	10 18	7 0	10 40	6 11	7 42	10 2	8 3	9 4			
S.	23	4 27	1 39	9 1	2 4	9 0	11 5	6 9	11 32	6 7	8 25	9 10	8 50	9 41			
Mo.	24	5 17	2 30	8 11	2 57	8 10	—	—	0 3	6 4	9 18	9 5	9 47	10 38			
M.	25	6 7	3 24	8 8	3 54	8 7	0 37	6 2	1 15	6 1	10 21	9 2	10 57	11 8			
Tu.	26	7 0	4 27	8 6	5 0	8 5	1 56	6 1	2 35	6 1	11 32	9 0	—	1 19			
W.	27	7 54	5 33	8 5	6 7	8 5	3 11	6 3	3 44	6 5	0 6	9 0	0 41	1 52			
Th.	28	8 50	6 44	8 5	7 19	8 6	4 16	6 8	4 43	6 10	1 18	9 3	1 52	2 4			
F.	29	9 48	7 50	8 7	8 20	8 10	5 8	7 0	5 33	7 1	2 23	9 8	2 52	3 43			
S.	30	10 47	8 48	9 0	9 15	9 2	5 58	7 3	6 25	7 5	3 18	10 3	3 43	4 34			
Mo.	31	11 46	9 41	9 4	10 6	9 6	6 52	7 7	7 18	7 8	4 7	10 10	4 31	5 22			
Half Mean Spring } Range.			4 ft. 9 in.				3 ft. 10 in.				5 ft. 7 in.						
Phases of the Moon.						Moon's Declination at Noon.											
D. H. M.						M.D.		° '		M.D.		° '		M.D.		° '	
Full - - - - 2 6 44 Afternoon.						1		15 N. 34		9		4 N. 15		17		18 S. 35	
Last Quarter - 10 0 13 Morning.						2		17 44		10		0 24		18		18 40	
New - - - - 18 4 45 Morning.						3		18 41		11		3 S. 24		19		17 50	
First Quarter - 25 0 31 Afternoon.						4		18 22		12		7 3		20		16 5	
						5		16 56		13		10 25		21		13 28	
In Perigee - - 1 4 0 Morning.						6		14 34		14		13 23		22		10 7	
In Apogee - - 13 3 0 Morning.						7		11 31		15		15 49		23		6 12	
In Perigee - - 29 3 0 Morning.						8		8 0		16		17 36		24		1 55	

The times of High Water are given for Mean Time at Place; if Dublin or Railway Time be required  
 BELFAST subtract 3 m.      LONDONDERRY add 4 m.      SLIGO BAY add 9 m.

## DECEMBER, 1865.

GALWAY.						QUEENSTOWN.						WATERFORD.						C's Age at Noon.						
MORNING.			AFTERNOON.			MORNING.			AFTERNOON.			MORNING.			AFTERNOON.									
no.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.		Time.	Height.								
M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.		H. M. F. I.	H. M. F. I.	D							
47	14	5	3	13	14	9	3	6	11	6	3	33	11	9	3	24	12	3	3	53	12	6	13.0	
38	15	1	4	3	15	4	4	0	12	0	4	27	12	2	4	22	12	9	4	50	12	10	0	
27	15	6	4	5	15	7	4	53	12	3	5	18	12	3	5	15	12	11	5	39	12	11	15.0	
16	15	7	5	40	15	5	5	43	12	3	6	6	12	2	6	3	12	11	6	26	12	10	16.0	
3	15	1	6	25	14	9	6	29	12	0	6	51	11	9	6	49	12	9	7	11	12	7	17.0	
49	14	4	7	12	13	11	7	13	11	6	7	35	11	2	7	33	12	4	7	54	12	1	18.0	
35	13	6	7	59	13	0	7	57	10	11	8	17	10	7	8	15	11	11	8	35	11	7	19.0	
24	12	5	8	48	11	11	8	38	10	3	9	0	10	0	8	55	11	3	9	14	11	0	20.0	
13	11	6	9	41	11	2	9	22	9	8	9	45	9	5	9	37	10	9	10	4	10	5	21.0	
9	10	10	10	41	10	9	10	9	9	3	10	39	9	1	10	32	10	1	11	1	9	11	22.0	
15	10	9	11	51	10	9	11	13	9	0	11	49	9	0	11	32	9	10	—	—	—	—	23.0	
—	—	—	0	23	10	11	—	—	—	—	0	21	9	1	0	3	9	9	0	34	9	10	—	24.0
53	11	1	1	21	11	3	0	53	9	2	1	25	9	4	1	4	9	11	1	34	10	0	—	25.0
47	11	7	2	10	11	11	1	57	9	6	2	24	9	8	2	6	10	3	2	35	10	10	—	26.0
32	12	2	2	52	12	6	2	47	9	11	3	9	10	2	3	1	10	8	3	25	10	11	—	27.0
12	12	9	3	31	13	0	3	31	10	4	3	52	10	7	3	49	11	1	4	12	11	4	—	28.0
50	13	3	4	9	13	6	4	13	10	9	4	33	10	11	4	35	11	6	4	56	11	7	—	29.0
28	13	9	4	46	13	11	4	52	11	1	5	12	11	2	5	15	11	8	5	34	11	10	—	30.0
5	14	1	5	24	14	2	5	32	11	3	5	51	11	4	5	53	11	11	6	12	12	0	—	1.3
44	14	2	6	3	14	2	6	10	11	4	6	29	11	4	6	31	12	0	6	50	12	1	—	2.3
23	14	1	6	43	14	0	6	49	11	4	7	8	11	3	7	10	12	1	7	29	12	1	—	3.3
4	13	10	7	26	13	8	7	28	11	2	7	49	11	0	7	48	12	0	8	8	12	0	—	4.3
49	13	5	8	14	13	2	8	10	10	10	8	31	10	8	8	28	11	10	8	49	11	8	—	5.3
39	12	9	9	5	12	6	8	53	10	6	9	16	10	4	9	9	11	6	9	30	11	4	—	6.3
33	12	2	10	6	12	0	9	41	10	2	10	9	10	0	9	57	11	2	10	29	10	11	—	7.3
40	11	10	11	16	11	11	10	39	9	10	11	14	9	10	11	1	10	9	11	33	10	7	—	8.3
53	12	0	—	—	—	—	11	50	9	10	—	—	—	—	—	—	—	—	0	6	10	6	—	9.3
30	12	2	1	4	12	6	0	28	9	11	1	6	10	1	0	40	10	8	1	15	10	10	—	10.3
34	12	10	2	4	13	2	1	43	10	4	2	18	10	7	1	51	11	1	2	29	11	5	—	11.3
33	13	7	3	1	13	11	2	49	10	10	3	19	11	2	3	4	11	8	3	37	11	11	—	12.3
27	14	3	3	52	14	6	3	48	11	4	4	14	11	7	4	7	12	2	4	36	12	4	—	13.3
in Spring } ange.			7ft. 5in.			5ft 10in.			6ft. 2in.															

## Equation of Time at Noon.

S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Add.	M.D.	M. S.	Sub.
40		9	7 20		17	3 32		25	0 28	
17		10	6 53		18	3 2		26	0 58	
54		11	6 25		19	2 32		27	1 27	
29		12	5 57		20	2 2		28	1 57	
5		13	5 28		21	1 32		29	2 26	
39		14	5 0		22	1 2		30	2 55	
13		15	4 30		23	0 32		31	3 24	
47		16	4 1		24	0 2				

of High Water are given for Mean Time at Place; if Dublin or Railway Time be required,—for  
 LSWAY add 11 m. | QUEENSTOWN add 8 m. | WATERFORD add 3 m.

## TIDE TABLES FOR THE

TABLE (B.)—For finding the Height of the Tide at any intermediate Hour between High and Low Water.

Height above Half-tide or Mean Level of the Sea.	Time from High Water.													
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
	0 00	0 30	1 00	1 30	2 00	2 30	3 00	3 30	4 00	4 30	5 00	5 30	6 00	6 30
Feet.	Add							Subtract						
	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.
3	3 0	2 11	2 7	2 1	1 6	0 9	0 0	0 9	1 6	2 1	2 7	2 11	3 0	3 6
4	4 0	3 10	3 6	2 10	2 0	1 0	0 0	1 0	2 0	2 10	3 6	3 10	4 0	4 6
5	5 0	4 10	4 4	3 6	2 6	1 3	0 0	1 3	2 6	3 6	4 4	4 10	5 0	5 6
6	6 0	5 10	5 2	4 3	3 0	1 7	0 0	1 7	3 0	4 3	5 2	5 10	6 0	6 6
7	7 0	6 9	6 1	4 11	3 6	1 10	0 0	1 10	3 6	4 11	6 1	6 9	7 0	7 6
8	8 0	7 9	6 11	5 8	4 0	2 1	0 0	2 1	4 0	5 8	6 11	7 9	8 0	8 6
9	9 0	8 8	7 9	6 4	4 6	2 4	0 0	2 4	4 6	6 4	7 9	8 8	9 0	9 6
10	10 0	9 8	8 8	7 1	5 0	2 7	0 0	2 7	5 0	7 1	8 8	9 8	10 0	10 6
11	11 0	10 8	9 6	7 9	5 6	2 10	0 0	2 10	5 6	7 9	9 6	10 8	11 0	11 6
12	12 0	11 7	10 5	8 6	6 0	3 1	0 0	3 1	6 0	8 6	10 5	11 7	12 0	12 6
13	13 0	12 7	11 3	9 2	6 6	3 4	0 0	3 4	6 6	9 2	11 3	12 7	13 0	13 6
14	14 0	13 6	12 1	9 11	7 0	3 7	0 0	3 7	7 0	9 11	12 1	13 6	14 0	14 6
15	15 0	14 6	13 0	10 7	7 6	3 11	0 0	3 11	7 6	10 7	13 0	14 6	15 0	15 6
16	16 0	15 5	13 10	11 4	8 0	4 2	0 0	4 2	8 0	11 4	13 10	15 5	16 0	16 6
17	17 0	16 5	14 9	12 0	8 6	4 5	0 0	4 5	8 6	12 0	14 9	16 5	17 0	17 6
18	18 0	17 5	15 7	12 9	9 0	4 8	0 0	4 8	9 0	12 9	15 7	17 5	18 0	18 6
19	19 0	18 4	16 5	13 5	9 6	4 11	0 0	4 11	9 6	13 5	16 5	18 4	19 0	19 6
20	20 0	19 4	17 4	14 2	10 0	5 2	0 0	5 2	10 0	14 2	17 4	19 4	20 0	20 6
21	21 0	20 3	18 2	14 10	10 6	5 5	0 0	5 5	10 6	14 10	18 2	20 3	21 0	21 6
22	22 0	21 3	19 1	15 7	11 0	5 8	0 0	5 8	11 0	15 7	19 1	21 3	22 0	22 6
23	23 0	22 3	19 11	16 3	11 6	5 11	0 0	5 11	11 6	16 3	19 11	22 3	23 0	23 6
24	24 0	23 2	20 9	17 0	12 0	6 2	0 0	6 2	12 0	17 0	20 9	23 2	24 0	24 6

**RULE.**—To find the Height of the Tide above the zero of the tables at any intermediate Hour between *High and Low Water*.\*

The zero of the tables is the mean height of the low water of ordinary spring tides.

From the height in the tables, subtract the half mean spring range, the remainder will be the height above the half-tide or mean level of the sea, with which enter Table (B.), and, under the time from high water, take out the corresponding correction, and, as directed, add it to,

\* The mean interval of time between two consecutive high waters is about 12h. 25m., but for the mariner's purpose the duration of flood or ebb may be considered as 6 hours. There are occasional exceptions; at Portsmouth, for example, the flood runs 7 hours and the ebb 5 hours.

or subtract it from, the half mean spring range; the result will be the height of the tide at that time above zero or the low-water standard of the tables.

## EXAMPLE I.

Required the height of the tide above zero at Liverpool on March 6th, A.M., at 2 h. after high water.

Height of high water (by the tables)	-	-	-	Ft. in.
Half mean spring range	-	-	-	19 8
				13 0
<hr/>				
Height above the half-tide or mean level of the sea	-	=	6	8
Half mean spring range	-	-	-	13 0
By table (B) 6 ft. 8 in. gives	-	-	-	+ 3 4
<hr/>				
Height of the tide above zero at 2 h. after high water	=	16	4	

## EXAMPLE II.

Required the height of the tide above zero, at Liverpool on March 27th, P.M., at 4 h. after high water.

Height of high water (by the tables)	-	-	-	Ft. in.
Half mean spring range	-	-	-	28 6
				13 0
<hr/>				
Height above the half-tide or mean level of the sea	-	15	6	
Half mean spring range	-	-	-	13 0
By table (B) 15 ft. 6 in. gives	-	-	-	- 7 9
<hr/>				
Height of the tide above zero at 4 h. after high water	=	5	3	

In some cases, however, between 5 and 6 h. from high water, the correction from table (B) will be greater than the half mean spring range; when such is the case, the tide at that time will have fallen *below* the zero of the tables by a quantity equal to the difference between the correction from table (B) and the half mean spring range.

## EXAMPLE III.

Required the level of the tide at Liverpool on March 27th, P.M. at 5½ h. after high water.

Height of high water (by the tables)	-	-	-	Ft. in.
Half mean spring range	-	-	-	28 6
				13 0
<hr/>				
Height above the half tide or mean level of the sea	-	15	6	
Half mean spring range	-	-	-	13 0
By table (B) 15 ft. 6 in. at 5½ h. from high water	-	-	-	15 0
<hr/>				
Level of the tide <i>below</i> zero	-	-	-	2 0

As stated in the advertisement, the soundings in most charts are reduced to the same zero as these tables,—viz., the mean level of the low water of ordinary spring tides,—but should the soundings on any particular chart be reduced to a standard below that zero, there will, in that case, be a greater depth of water in the channel than is given in the tables, by a quantity equal to the difference between the half mean spring range and the half spring range of the chart, or in other words, the difference between the mean level of the low water of spring tides, and the low-water standard to which the soundings on the chart are reduced: for example—The soundings on the chart of Liverpool are reduced to a zero 15 ft. below the mean level of the sea, whereas, the mean spring range for that place, as shown in the result of two years' observations



|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

\* To be shortly opened.

		Ft.	in.
Over the Sill of Northern West Lock Entrance	-	2	0
" Southern West Lock Entrance	-	2	0
" " North Passage	-	5	0
" " South Passage	-	0	3
" Canada Dock, South Passages, East	-	1	6
" " " West	-	1	6
" " Lock	-	0	3
" Huskisson Dock, East Lock	-	1	6
" " West	-	2	0
" Sandon Dock, West Entrance	-	1	6
" Wellington Half-tide Dock, East Entrance	-	1	3
" " " West	-	1	6
" Wellington Dock, West Passage	-	1	6
" Bramley-Moore Dock, North Passage	-	2	0
" " South Passage	-	2	0
" Nelson Dock, South Passage	-	1	6
" Stanley Dock, West Passage	-	2	4
" Collingwood Dock, West Passage	-	1	3
" Salisbury Dock, West Entrances, North	-	1	1
" " South	-	1	1
" Clarence Graving Dock Basin, N. Passage	-	3	3
" " S. Passage	-	3	6
" Clarence Half-tide Dock, West Entrance	-	2	6
" " Dock, West Passage	-	4	10
" Trafalgar Lock, North and South Passages	-	1	5
" " Dock, South Passage	-	3	1
" Victoria Dock, South Passage	-	3	1
" Waterloo Dock and Lock, North Passage	-	0	9
" " South Entrance	-	0	9
" Princes Dock and Locks, North Entrance	-	0	9
" " South Entrance	-	0	9
" Georges Dock and Passage, North Entrance	-	3	6
" " South Passage	-	3	6
" Manchester Dock, West Entrance	-	8	3
" " Lock, West Entrance	-	4	0
" Canning Dock, West Passage	-	1	11
" " Half-tide Basin, two West En- trances, each	-	1	9
" Albert Dock, North Passage	-	1	8
" " East Passage	-	2	0
" Salthouse Dock, North Passage	-	2	0
" Wapping Basin, West Passage	-	2	0
" " North and South Passages, each	-	2	0
" " Dock, West Passage	-	2	0
" " South Passage	-	2	0
" Kings Dock, South Passage	-	3	0
" Queens Dock Basin, West Entrances, North	-	1	3
" " South	-	1	3
" " West Passage	-	2	0
" " South Passage	-	1	6
" Coburg Dock, West Entrance	-	2	0
" Brunswick Dock, North Passage	-	1	6
" " Half-tide Dock, East Passage	-	2	6
" " West Entrance	-	2	0
" Toxteth Dock, West Entrance	-	3	0
" Harrington Dock, West Entrance	-	6	10
" Herculaneum, North Passage	-	0	6
" " South Passage	-	0	6
" Garston Dock	-	2	0

*Liverpool*—continued :

		Ft.	in.
Over the Sill of River Craft Dock, Lock, and Eagle Basin,	Outer Gates	— 8	3
" " " " "	Inner " -	— 9	3
" Duke of Bridgewater's Dock, Outer Gates		— 3	6
" " " " "	Middle " -	— 8	6
" " " " "	Inner " -	— 2	0
" Canada Lock and Graving Dock	-	— 0	3
" Huskisson Lock and Graving Dock	-	— 1	6
" Sandon Graving Docks, Nos. 1 to 5, East	-	— 4	6
" " " " " No. 6, West	-	— 4	6
" Canning Graving Docks, No. 1	-	— 9	9
" " " " " No. 2	-	— 8	0
" Queens Graving Docks, No. 1	-	— 6	4
" " " " " No. 2	-	— 4	6
" Brunswick Graving Docks, No. 1	-	— 5	6
" " " " " No. 2	-	— 5	6

*Birkenhead*—

Over the Sill of Morpeth Dock from Morpeth Basin	-	— 3	0
" Sills of Caisson between Egerton and Morpeth Docks	-	— 0	6
" Sill of Reverse Gate	-	— 2	6
" Sills of Caisson between Egerton Dock and Great Float	-	— 0	6
" " " " " East and West Floats	-	— 0	6
" Lock from Low-water Basin into Great Float.			
	Outer Sill	+ 4	0
	Inner Sill	+ 1	0
" Graving Dock No. 1.	-	— 0	6
" " " " " 2.	-	— 0	6

(applied to the heights given for Liverpool.)

*Dublin*—

Over the Sill of North Wall Graving Dock	-	+ 6	0
" Old Custom House Dock	-	+ 3	5
" Georges Dock	-	+ 5	5
" Camden Lock of Grand Canal Dock	-	+ 7	0

(applied to the heights given for Kingstown.)

*Londonderry*—

Over the Sill of Graving Dock	-	+ 6	9
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## TIDAL CONSTANTS

FOR

## VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

THE following table contains Tidal Constants for several places on the coasts of the United Kingdom and of Europe, which, being applied according to the sign + or — to the times or heights belonging to the standard port to which each of them is referred, will afford a ready means of determining approximately the height as well as the time of high water at each of those several places.

[NOTE.] In the tables from 1850–1858 the Constants for the height were given for such places only where the curves for the place and the standard port were similar, the Constant being the difference between the whole rise at the two places. But as that arrangement, which at times referred necessarily to a standard port on a distant part of the coast, appears to have confused the mariner, he is now referred to the standard port in the locality of the required place, which although the result deduced thereby may not be strictly accurate, yet it is sufficiently near for practical purposes.



COAST OF IRELAND	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Skull . . . . .	— 0 59	— 2 1	Queenstown.
Crookhaven . . . . .	— 0 52	..	"
Dunmanus Harbour . . . . .	— 1 4	— 2 4	"
Dunbeacon, Dunmanus Bay . . . . .	— 1 10	— 1 7	"
Black Ball Harbour . . . . .	— 1 21	— 2 3	"
Castletown, Bearhaven . . . . .	— 0 47	— 2 0	"
Bantry Harbour . . . . .	— 1 14	— 1 7	"
West Cove, Kenmare River . . . . .	— 1 9	— 1 9	"
Valentia Harbour . . . . .	— 1 19	— 0 8	"
Limerick, R. Shannon . . . . .	+ 1 45	+ 1 9	Galway.
Mellon . . . . .	+ 1 26	..	"
Foynes Island . . . . .	+ 1 0	+ 0 7	"
Tarbert . . . . .	+ 0 22	— 0 7	"
Kilrush . . . . .	+ 0 7	..	"
Carrigaholt . . . . .	+ 0 9	..	"
Kilbaha . . . . .	— 0 19	— 1 9	"
Roundstone . . . . .	— 0 50	+ 1 9	Sligo.
Inishbofin . . . . .	— 0 44	+ 0 4	"
Westport . . . . .	— 0 21	+ 1 1	"
Achillbeg . . . . .	— 0 4	— 0 6	"
Blacksod Bay (Quay) . . . . .	— 0 31	..	"
Broadhaven Harbour . . . . .	— 0 18	— 0 9	"
Donegal Harbour, (Salthill Quay) . . . . .	+ 0 5	..	"
Killybegs . . . . .	+ 0 13	..	"
Lough Rossmore . . . . .	+ 0 19	..	"
Gweedore Bay (Bunbeg) . . . . .	+ 0 14	— 0 6	"
Sheephaven . . . . .	+ 0 7	+ 0 7	"
Rathmullan, Lough Swilly . . . . .	+ 0 24	..	"
Coleraine . . . . .	— 1 37	— 1 6	Londonderry.
Port Rush . . . . .	— 1 53	— 2 6	"
Ballycastle Bay . . . . .	— 4 18	..	Belfast.
Lough Larne . . . . .	— 0 13	..	"
Donaghadee . . . . .	+ 0 3	+ 0 3	Kingstown.
Lough Strangford (Killard Point) . . . . .	— 0 17	..	"
" Strangford Quay . . . . .	+ 1 21	..	"
" Carlingford (Bar) or Cranfield Point . . . . .	— 0 10	..	"
Warrenpoint . . . . .	0 0	+ 3 1	"
Howth . . . . .	— 0 1	..	"
Dublin Bar . . . . .	+ 0 2	..	"
Wicklow . . . . .	— 0 41	..	"
Arklow . . . . .	— 2 25	..	"
Wexford . . . . .	+ 2 1	— 7 4	Waterford.
New Ross . . . . .	+ 0 44	+ 0 1	"
Waterford Bridge . . . . .	+ 0 46	+ 1 0	"
Dunmore . . . . .	+ 0 7	— 0 2	"
Ballinacourty, Dungarvan . . . . .	— 0 8	0 0	"
Youghal . . . . .	— 0 6	+ 0 3	"
Ballycotton . . . . .	— 0 26	— 0 5	"
Kinsale . . . . .	— 0 18	— 0 4	Queenstown.
Courtmacsherry . . . . .	— 0 25	— 1 1	"
Castletownsend . . . . .	— 0 40	— 1 0	"
Baltimore . . . . .	— 0 38	..	"

PORTS OF GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
ves . . . . .	— 2 10	..	Weston-super-mare.
stow . . . . .	— 1 41	..	"
dy Island . . . . .	— 1 39	..	"
staple Bar . . . . .	— 1 24	..	"
combe . . . . .	— 1 12	..	"
gewater Bar . . . . .	— 0 4	..	"
ishead . . . . .	+ 0 22	..	"
tol (King Road) . . . . .	+ 0 2	..	"
liff . . . . .	+ 0 5	..	"
nsea (Mumbles Lighthouse)	— 0 11	..	Pembroke.
elly . . . . .	+ 0 4	..	"
by . . . . .	— 0 12	..	"
ord Haven (entrance) . . . . .	— 0 20	..	"
guard, Goodic Pier . . . . .	— 3 15	— 4 5	Holyhead.
ligan . . . . .	— 3 10	..	"
rystwyth . . . . .	— 2 40	— 3 0	"
rdovey . . . . .	— 2 11	..	"
nouth . . . . .	— 2 31	..	"
heli . . . . .	— 2 25	..	"
lsey Island . . . . .	— 2 31	..	"
h-dyn-lleyn . . . . .	— 1 41	..	"
rnarvon . . . . .	— 0 38	— 2 3	"
umaris . . . . .	— 0 51	— 4 7	Liverpool.
Fleetwood (Wyre Lighthouse)	— 0 12	..	"
lton-le-Sands . . . . .	+ 0 3	+ 1 3	"
tehaven . . . . .	— 0 9	— 2 9	"
Bees Head and Port Har- } ngton . . . . .	— 0 18	..	"
rkington . . . . .	— 0 19	..	"
yport . . . . .	— 0 20	..	"
ey Head . . . . .	— 0 13	..	"
therness . . . . .	— 0 3	..	"
an Foot . . . . .	+ 0 33	..	"
t Carlisle . . . . .	+ 0 47	..	"
glas, Isle of Man . . . . .	+ 1 1	..	Holyhead.
asey " . . . . .	+ 1 1	+ 3 3	"
l " . . . . .	+ 0 57	+ 0 3	"
n Point, Solway Firth . . . . .	— 0 1	— 2 11	Liverpool.
t Patrick . . . . .	— 0 58	..	Greenock.
h Ryan . . . . .	— 0 56	..	"
lash . . . . .	— 0 19	..	"
pbellton . . . . .	— 0 23	..	"
. . . . .	— 0 18	— 1 0	"
rossan . . . . .	— 0 23	..	"
gs . . . . .	— 0 18	..	"
erary . . . . .	— 0 2	..	"
t Glasgow . . . . .	+ 0 10	..	"
sgow . . . . .	+ 1 17	..	"
ian . . . . .	+ 4 41	..	"
ermory, Isle of Mull . . . . .	— 2 52	..	Thurso.
tree, Isle of Skye . . . . .	— 1 56	..	"
h Inver . . . . .	— 1 47	..	"
e Akin . . . . .	— 2 12	..	"
era, Summer Isles . . . . .	— 1 51	..	"
noway, Isle of Lewis . . . . .	— 1 42	..	"
e Wrath . . . . .	— 0 58	..	"

PORTS OF GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Stromness . . . . .	+ 0 32	..	Thurso.
Lerwick . . . . .	+ 2 2	..	"
Wick . . . . .	- 2 55	..	Leith.
Dornock Road . . . . .	- 2 17	..	"
Cromarty . . . . .	- 2 21	..	"
Inverness . . . . .	- 1 59	..	"
Banff . . . . .	- 1 49	..	"
Peterhead . . . . .	- 1 43	..	"
Aberdeen . . . . .	- 1 17	..	"
Stonehaven . . . . .	- 1 7	..	"
Montrose . . . . .	- 0 52	..	"
Arbroath . . . . .	- 0 42	..	"
Tay Bar . . . . .	- 0 11	..	"
Broughty Ferry . . . . .	+ 0 5	..	"
Dundee . . . . .	- 0 50	+ 0 2	Sunderland.
Dunbar . . . . .	- 1 14	0 0	"
Berwick . . . . .	- 1 4	..	"
Holy Island . . . . .	- 0 52	..	"
Blyth . . . . .	- 0 7	..	"
Tynemouth Bar . . . . .	- 0 2	..	"
Seaham . . . . .	+ 0 2	..	"
Hartlepool . . . . .	+ 0 6	+ 0 8	"
Whitby . . . . .	+ 0 23	..	"
Scarborough . . . . .	+ 0 49	+ 1 5	"
Filey Bay . . . . .	+ 0 58	..	"
Flamborough Head . . . . .	- 1 59	..	Hull.
Bridlington . . . . .	- 1 50	..	"
Spurn Point . . . . .	- 1 3	..	"
Great Grimsby . . . . .	- 0 53	- 1 8	"
Lynn and Boston Deep . . . . .	- 0 29	..	"
Wells Bar . . . . .	- 0 9	..	"
" Harbour . . . . .	+ 0 31	..	"
Blakeney Bar . . . . .	+ 0 1	..	"
Yarmouth Road . . . . .	- 2 51	..	Harwich.
Lowestoft . . . . .	- 2 9	..	"
Orfordness . . . . .	- 0 51	..	"
Nore . . . . .	- 0 7	..	Sheerness.
Chatham . . . . .	+ 0 25	..	"
Gravesend . . . . .	- 0 57	..	London.
Woolwich . . . . .	- 0 28	..	"
Greenwich . . . . .	- 0 24	..	"
London Docks . . . . .	- 0 10	+ 0 4	"
Margate . . . . .	- 2 27	..	"
Ramsgate . . . . .	- 2 23	- 4 1	"
Deal . . . . .	+ 0 3	..	Dover.
Folkstone . . . . .	- 0 5	..	"
Dungeness . . . . .	- 0 27	..	"
Rye Bay . . . . .	+ 0 8	..	"
Hastings . . . . .	- 0 19	..	"
Beachy Head . . . . .	+ 0 8	..	"
Newhaven . . . . .	+ 0 39	..	"
Shoreham . . . . .	+ 0 22	- 1 2	"
Littlehampton . . . . .	- 0 5	..	Portsmouth.
Selsea Bill . . . . .	+ 0 4	..	"
Bembridge Point . . . . .	- 0 41	..	"

PLACES OF GREAT BRITAIN.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Ampton . . . . .	— 1 11	..	Portsmouth.
Cowes . . . . .	— 0 56	..	..
Camber . . . . .	— 1 41	..	..
es Point . . . . .	— 1 55	..	..
church . . . . .	— 2 41	..	..
.. . . . .	— 2 31	..	..
rd Breakwater . . . . .	— 4 40	— 5 10	..
Regis . . . . .	+ 0 38	..	Devonport.
ith . . . . .	+ 0 38	..	..
.. . . . .	+ 0 17	..	..
outh . . . . .	+ 0 33	..	..
uth Breakwater . . . . .	— 0 6	..	..
ooe . . . . .	— 0 17	..	..
.. . . . .	— 0 29	..	..
uth . . . . .	— 0 46	..	..
ice . . . . .	— 1 13	..	..
Isles (St. Mary) . . . . .	— 1 16	..	..
WESTERN COAST OF EUROPE.			
Bar . . . . .	— 1 27	..	Brest.
.. . . . .	— 2 2	..	..
(Bar) . . . . .	— 1 17	..	..
.. . . . .	— 1 17	..	..
.. . . . .	— 0 47	..	..
der . . . . .	— 0 17	..	..
ne . . . . .	— 0 2	..	..
ion . . . . .	+ 0 50	..	..
e Cordouan . . . . .	— 0 10	..	..
ux . . . . .	+ 3 3	..	..
ix . . . . .	— 0 27	..	..
eu . . . . .	— 0 41	..	..
Noirmoutier . . . . .	— 0 45	..	..
avalo . . . . .	— 0 5	..	..
zaire . . . . .	— 0 7	..	..
le . . . . .	— 0 29	..	..
ouis . . . . .	— 0 36	..	..
oncarneau . . . . .	— 0 35	..	..
Sein . . . . .	— 0 26	— 1 9	..
nt (Ushant) . . . . .	— 0 15	— 0 1	..
NORTHERN COAST OF EUROPE.			
ach . . . . .	+ 0 27	..	Brest.
.. . . . .	+ 1 6	..	..
escan . . . . .	+ 1 30	..	..
.. . . . .	+ 2 4	..	..
lo . . . . .	+ 2 18	..	..
lle . . . . .	+ 2 26	..	..
Chausey . . . . .	+ 2 22	..	..
(St. Helier) . . . . .	+ 2 38	..	..
ey (St. Peter Port) . . . . .	+ 2 50	..	..
us . . . . .	+ 2 45	..	..

NORTHERN COAST OF EUROPE.	Constants.		Standard Port for Reference.
	Time.	Height.	
	H. M.	FT. IN.	
Alderney . . . . .	+ 2 59	..	Brest.
Cherbourg . . . . .	+ 4 2	..	"
Barfleur . . . . .	+ 5 4	..	"
La Hougue . . . . .	+ 4 55	..	"
Honfleur . . . . .	+ 5 42	+ 4 3	"
Quillebœuf . . . . .	+ 6 19	- 9 7	"
Havre . . . . .	+ 6 4	..	"
Fécamp . . . . .	+ 6 57	+ 4 2	"
Dieppe . . . . .	+ 7 19	..	"
Cayeux . . . . .	+ 7 18	..	"
Boulogne . . . . .	+ 0 13	..	Dover.
Cape Grisnez . . . . .	+ 0 15	+ 2 4	"
Calais . . . . .	+ 0 37	+ 0 10	"
Dunkerque . . . . .	+ 0 56	..	"
Nieuport . . . . .	+ 1 6	..	"
Ostend. . . . .	+ 1 13	..	"
Flushing . . . . .	+ 2 8	..	"
Antwerp . . . . .	+ 5 13	..	"
Hellevoetsluis . . . . .	+ 3 18	..	"
Rotterdam . . . . .	+ 4 33	..	"
Helgoland . . . . .	- 0 33	- 2 10	Harwich.

### SET OF THE TIDES ALONG THE SOUTH COAST OF ENGLAND.

The tides about Plymouth Sound are tolerably regular, both flood and ebb, generally running each way about six hours and ten minutes at a mean. In Hamoaze the flood stream continues to run up, on spring tides, about fifteen minutes after high water at Devonport Dock-Yard.

It is high water in Catwater rather earlier than at the Dock-Yard; but with strong winds from the southward and westward the tide flows half an hour longer in both harbours.

At the Breakwater in Plymouth Sound it is high water a few minutes earlier than at the Dock-Yard, but the stream drains in for a short time after the water has ceased to rise.

Abreast of Plymouth Sound, about 6 miles from the land, the streams are very irregular and do not turn with the tide farther out in the offing. One hour and three-quarters before high water at the Dock-Yard the stream makes to the eastward and runs about E. by S. for one hour; during the next hour it is scarcely sensible, after which it turns to the southward, gradually changing to W.S.W. till the last quarter of the ebb on the shore, when it veers from W.S.W. to W.N. During the first 3 hours flood on the shore, its direction changes from W.N.W. to N.W., when it begins to slacken, and to set about North till at the last  $4\frac{1}{2}$  hours flood it runs E. by S. as at first.

Four miles south-west of the Eddystone the stream begins to run E. by S. when it is high water at the Dock-Yard, and continues about two hours and three-quarters, when it slacks and shifts to the southward. At  $3\frac{1}{4}$  hours ebb on the shore it sets W.S.W.; at 4 hours W. by N.; and then W.N.W. until low water. During the first 2 hours flood on the shore the stream sets N.W. by W., and loses its strength during the third hour, running N.W. and North. During the fourth hour, what little stream there is sets N.N.E. and N.E.; and then E.N.E. and E. by N. till about high water, when its direction is E. by S.

From Bolt Tail to Start Point, at 4 miles off shore, the eastern stream makes at 3 hours after high water, and the western stream 3 hours after low water on the shore; the stream sets along the land, and its greatest velocity is  $2\frac{3}{4}$  knots. At neaps the turn of the stream is irregular, varying from 4 to 7 hours after high and low water on the shore, the average being 5 hours. Its rate at neaps is  $1\frac{1}{2}$  knots: off the Start  $2\frac{1}{2}$  knots.

Off Exmouth Bar, at three quarters of a mile, south of Straight Point, at full and change, the stream turns to the eastward at 3h. 40m. and to the westward at 11 h. 0m., running in the latter direction about  $4\frac{3}{4}$  hours. The direction of the western stream for the first 2 hours is W.S.W.; for the next 2 hours west, and then turns gradually to the northward. The direction of the eastern stream for the first quarter is E.N.E.; at half-tide, E. by N.; and the greatest velocity of both streams is about 1 knot.

Three miles south of Beer Head, the stream turns to the westward at 10 h. 30m., and runs in that direction 4 hours, then gradually turns to the northward and runs for 2 hours between W.N.W. and N.E. by N. It may be said to turn to the eastward about 5 o'clock, and for  $2\frac{1}{2}$  hours, or until half tide, sets from N.E. to E. by N., and for the next 3 hours gradually turns to the southward. The direction of the tide in this position is, therefore, round the compass, with little or no velocity, as even at springs it scarcely runs a knot, and that only for a very short period.

In West Bay, at 2 miles N.N.W. of the Bill of Portland, at full and change, the tide begins to turn at 6h. 35m. and sets as follows: 1st hour of the ebb by the shore, at Portland Breakwater, S.  $\frac{1}{2}$  E.,  $1\frac{3}{4}$  knots. 2d hour, S.  $\frac{1}{2}$  W.,  $1\frac{3}{4}$  knots. 3d hour, S. by W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  knots. 4th hour, S.W. by S., three quarters of a knot. 5th hour, N.W.  $\frac{3}{4}$  N., nil. 6th hour, from N.N.W. to N.  $\frac{1}{2}$  W., three quarters of a knot. 7th hour N.N.E. to E. by N., 1 knot. 8th hour, S.E.  $\frac{1}{2}$  E.,  $1\frac{1}{4}$  knots. 1st hour of the flood, S.E. by S.,  $1\frac{1}{2}$  knots. 2d, 3d, 4th, and 5th hours, S.S.E., 2 knots.

At  $2\frac{1}{2}$  miles S.E.  $\frac{1}{2}$  S. of the Bill of Portland, near the west end of the Shambles, the 1st hour of the flood by the shore sets west, at the rate of  $1\frac{1}{4}$  to half a knot. 2d hour, E.  $\frac{1}{2}$  N., half a knot. 3d hour, E. by N.,  $2\frac{3}{4}$  knots. 4th hour, E.N.E.  $\frac{3}{4}$  E.,  $3\frac{3}{4}$  knots. 5th hour, east,  $3\frac{3}{4}$  knots. At the 1st hour of the ebb, E. by S.,  $3\frac{1}{2}$  knots. 2d hour, E. by S. to S.E. by S.,  $2\frac{1}{2}$  to  $1\frac{1}{2}$  knots. 3d hour, south, 1 knot. 4th hour, S.W. by S.,  $1\frac{1}{2}$  knots. 5th hour, W.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{2}$  knots. 6th hour, W. by S., 2 knots. 7th hour, W. by S.,  $2\frac{1}{4}$  knots. 8th hour, W.S.W.  $\frac{3}{4}$  W.,  $1\frac{3}{4}$  knots. N.B.—About a mile south of the Bill, at half flood, by the shore, the tide sets from S.S.E. to S.E.  $\frac{1}{2}$  E., and the opposite stream about W.S.W.  $\frac{1}{2}$  W.: the velocity of both streams, at springs, is from 5 to 6 knots; but although the tide runs with such violence near the Race, about a mile S.W. of the Bill the tide was found very weak.

At 5 miles E.S.E. of the Bill of Portland, near the east end of the Shambles, the 1st hour of the flood by the shore sets west,  $1\frac{1}{2}$  knots. 2d hour, from West to N. by E., very weak. 3d hour about E.N.E., very weak. 4th hour, E. by N., 2 knots. 5th hour, E. by N.,  $2\frac{3}{4}$  knots. The 1st hour of the ebb sets E.N.E.,  $3\frac{1}{2}$  knots. 2d hour, E.N.E.,  $3\frac{1}{4}$  knots. 3d hour, east,  $2\frac{3}{4}$  knots. 4th hour, east and E. by N.,  $1\frac{1}{4}$  knots. 5th, east, N. by W., and W. by N., very weak. 6th, 7th, and 8th, about west, from  $2\frac{3}{4}$  to  $2\frac{1}{4}$  knots.

In Portland and Weymouth Roads there is very little tide, so that the stream is scarcely sensible, and continues to be very moderate along the shore from Weymouth to St. Albans Head.

S.S.W.  $\frac{1}{2}$  W.,  $1\frac{1}{4}$  miles from St. Albans Head, the western stream, at full and change, makes at 10h. 45m., and the eastern stream at 4h. 45m.: the flood and ebb are of equal duration, the former setting S.E., and the latter from W.N.W. to N.W. by W.; their greatest velocity being at half tide from  $4\frac{1}{2}$  to  $4\frac{3}{4}$  knots.

At 1 mile S.E. of Durlstone Head, at full and change, the western stream makes at 10h. 25m., and the eastern stream at 4h. 25m., the former setting W.S.W., and the latter E.N.E.; their greatest velocity being about 3 knots: the indraught of the flood stream in thick weather might prove fatal to a ship not on her guard.

At a third of a mile E.S.E. of Peverel Point, at full and change, the western stream makes at 8h. 40m., and the eastern stream at 4h. 0m., the former setting S.W. and the latter N.E.; on the ebb there is a dangerous race over the Ledge, which extends about a mile off the Point. The velocity of the ebb stream is about 3 knots, and that of the flood about  $1\frac{1}{2}$  knots. Off Old Harry at three quarters of a mile N.E. by E. of Standfast Point, at full and change, the western stream makes at 9h. 45m., and the flood or eastern stream at 4h. 10m., the flood setting from N.E. by E. to N. by E. at the rate of 1 knot, and the ebb from S. by W. to S.W. 2 knots.

At the Needles, at full and change, the western stream makes at 10h. 0m., and the flood or eastern stream at 3h. 40m., and the velocity of both streams over the Bridge and in the South Channel is from 3 to 4 knots; but between Hurst Point and the Island,  $5\frac{1}{2}$  knots, and to the southward of the Bridge about 2 knots. In the Solent, the eastern or flood stream makes at 4h., and near the Bramble at 4h. 30m.\*

In Freshwater Bay, about 1 mile S.W. of Brook Point, and the same distance off Atherfield Point, at full and change, the western stream makes at 10h. 25m., and runs at the rate of 1 knot, and the flood or eastern stream at 2h. 35m. from 2 to  $2\frac{3}{4}$  knots; both streams take the direction of the coast. W. by S.  $4\frac{1}{2}$  miles from St. Catherine Point, the western stream makes at 11h., setting N.W.  $\frac{3}{4}$  W. and the flood or eastern stream at 5h., in the opposite direction S.E.  $\frac{3}{4}$  E., the rate of both being from 2 to 4 knots; but at 1 mile W. by S. from the Point the streams set N.W. by N. and S.E. by S., 3 to 4 knots, and at two thirds of a mile S.S.W. of the Point, W. by N. and E. by S., with the same velocity.

Nearly 5 miles S.S.E. of Dunnose, at full and change, the stream turns at 10h. 40m. and 4h. 30m. and sets E.  $\frac{1}{2}$  S. and W. by N.; velocity, from 4 to 5 knots; but S.E., 2 miles from Dunnose, the flood sets E. by N., and turns at the same time as in Portsmouth Harbour, and the ebb W. by S., but one hour earlier than it does in the harbour.

Princessa. At the N.W. buoy, at full and change, the western stream makes at 10 o'clock, and runs 6 hours W.S.W.  $\frac{1}{2}$  W. The eastern stream commences at 4 o'clock, and sets very nearly in the opposite direction, E.N.E. At the S.E. buoy the tides are about half an hour later, and set as follows; viz., the western stream, first part, W.  $\frac{3}{4}$  S., gradually becomes more southerly, and at the last of the tide runs S.W. by S. The course of the eastern stream is pretty nearly the same throughout the whole of the tide, E. by N.

At the Nab Light Vessel, the tidal stream is nearly rotary, which is probably caused by the Spithead tide meeting the tide round Dunnose

\* In the Solent, and as far to the westward as Portland, there are what are termed the *first* and *second* high waters. This double high water is probably caused by the tidal stream at Spithead, for, as long as that stream runs strong to the westward the tide is kept up in Southampton water, and there is no fall of consequence until the stream begins to slack at Spithead, but when the stream makes to the eastward at Spithead the water falls rapidly at Southampton. After low water, the tide rises there pretty steadily for 7 hours, which may be considered as the *first* or proper high water; it then ebbs for an hour about 9 inches, at the end of which time it again commences to rise, and in about  $1\frac{1}{2}$  hours reaches its former level, and sometimes higher; this is called the *second* high water. To the mariner, the knowledge that the high water at Southampton remains nearly stationary for rather more than 2 hours may, in some cases, be important. Similar *first* and *second* high waters occur on either shore of the Solent, as shown in the times of high water at full and change, page 149.

At Havre, on the French coast, the high water remains stationary for one hour, with a rise and fall of 3 or 4 inches for another hour, and only rises and falls 13 inches for the space of 3 hours; this long period of nearly slack water is very valuable to the traffic of the port, and allows from 15 to 16 vessels to enter or leave the docks same tide.

somewhere near the Light Vessel; for instance, at the 1st hour's flood by the shore it sets East; 2d and 3d hours, E.N.E.; 4th, N.E.; 5th, N.E. by N.; 6th, North; 7th, N.N.W. to N.W.; and the last drain of the flood, N.W. by W. The 1st hour's ebb sets W. by N.; 2d W. by S. to W.S.W.; 3d, S.W. by W. to S.W.; 4th, S.W.  $\frac{1}{2}$  S., the first part of the 5th hour, S.S.W., gradually trending to the southward until low water by the shore, when it sets S.E. There are only a few minutes slack. At full and change, the eastern stream makes at 8h. 30m., and the western stream at 12h. 15m.

At the Warner, at full and change, the eastern stream makes at 2 o'clock, and runs  $7\frac{1}{2}$  hours about S.S.E.; and the western stream at 9h. 30m., and runs nearly  $4\frac{1}{2}$  hours N.N.W.

Near the Horse Elbow, the tide must be strictly attended to, for in many cases it sets directly over that shoal. The eastern stream makes at 2 o'clock,  $2\frac{1}{2}$  hours after the tide on the shore, and runs to the S.E.  $7\frac{1}{2}$  hours; the western stream makes at 9h. 15m.,  $4\frac{1}{2}$  hours after low water on the shore, and runs nearly 5 hours to the N.W.

At the Dean Elbow, at full and change, the eastern stream, which sets over that shoal, makes at 2 o'clock, runs to the S.E. for 2 hours, and then sets east for the remainder of the tide,  $5\frac{1}{2}$  hours; the western stream makes at 9h. 45m., and runs W.N.W.  $4\frac{1}{2}$  hours.

At Spithead, at full and change, the eastern stream makes about 2 o'clock,  $2\frac{1}{2}$  hours after high water in the harbour, and runs 7 hours S.E. by S.; and the western stream about 9 o'clock,  $2\frac{1}{2}$  hours before high water in the harbour, and runs 5 hours N.W. by N.

In Portsmouth Harbour the flowing continues about seven hours, and a narrow stream runs in, fifteen or twenty minutes after high water at the Dock-Yard. From the result of three years' observations taken at the Dock-Yard it appears that at high water, slack water at springs continues for eight minutes, and at neaps sixteen minutes.

Looe Stream. At the western entrance near the Pullar Buoy, at full and change, the eastern stream makes at 3h. 45m., and the western stream at 10 hours, and sets S.E. and N.W. Between 2 and 3 miles outside of the Boulder Bank, the stream turns about an hour later; the eastern stream setting E.S.E. and the western stream west. Between the Pullar Bank and the Middle Owers, the eastern stream sets E.S.E. and the western stream west. At the eastern entrance, near East-borough Head, the eastern stream makes at 4h. 30m., and sets E.N.E.  $\frac{1}{2}$  E., and the western stream at 9h. 50m. west. Off the west end of the Hooe Bank, the eastern stream makes at 4h. 35m. and sets E.S.E., and the western stream at 10h. 30m. W.  $\frac{3}{4}$  N.

About 1 mile S.S.E. of the South Foreland Lighthouse, the stream begins to set to the eastward about 1h. 30m. before high water on the shore at Dover, and runs from N.E. by E. to E.N.E. about  $5\frac{1}{2}$  hours, or till 4 hours after high water: it then turns and sets W.S.W.  $\frac{1}{4}$  W. about 7 hours. At Dover the flowing stream very seldom continues more than 5 hours, and sometimes scarcely so much; it is nearly the same at Ramsgate. To the northward of the South Foreland the streams change their direction to N.E.  $\frac{1}{2}$  N. and S.W.  $\frac{1}{2}$  S.

In the Downs the north-eastern stream begins about 1h. 20m. before high water at Dover, and continues to run 5h. 30m.: it then turns and runs in a contrary direction till 2 hours before the ensuing high water.\*

In the Gull Stream, 1 mile N.N.W. from the Bunthead, the northern stream begins about 1h. 10m. before high water at Dover, and continues for 6 hours: it then turns and runs in a contrary direction till  $1\frac{1}{2}$  hours before the ensuing high water. Its direction is N.E.  $\frac{3}{4}$  N.; but the last hour changes to E.N.E., and even to the southward of East; the last hour of the southern stream changes from S.W.  $\frac{3}{4}$  S. to W.S.W., and even to the northward of West.

\* For the tides at the Southsand Head and Northsand Head of the Goodwin, see Compartment VI.



## TIDES ON THE EAST COAST OF SCOTLAND AND ENGLAND.

In the North Sea the flood tide-wave enters from the Atlantic Ocean between the coast of Norway and the British Isles, and passes through the various channels formed by the Shetlands, the Orkneys, and the north point of Scotland. The average rate of the stream in the offing is very moderate, not exceeding a knot and a half; but that part of the stream which enters by the Pentland Firth acquires a furious rapidity, amounting at spring tides even to eight knots. Immediately on quitting the Firth, however, it abates in strength, as it diverges into open water; its eastern branch filling up the basin of the North Sea as it advances towards the coast of Jutland and Holland; whilst its western branch, more or less confined by the Dogger and other outlying banks, swells along the shores of Scotland and England, and makes high water in all their rivers and harbours successively till it arrives in the Thames.

The following remarks will assist the seaman in tracing the movement of the tide stream along the coast:—

Off Clythness and Ord Head its rate is about 3 knots at the springs and  $1\frac{1}{2}$  with the neaps, and continues to run to the southward till 11 o'clock, or till 3h. 40m. before high water at Leith. Off Covesea Point, Burgh Head, and thence westward towards Fort George and Cromarty, it runs about an hour longer.

Off Cullen the flood stream sets slowly to the eastward, increasing in velocity as it advances: off Troop Head it runs till 1 o'clock, or till 1h. 20m. before high water at Leith; off Kinnaird Head it attains the rate of 2 knots on springs, and is still accelerated as it passes Rattray Brigs till off Peterhead, which is occasioned by the junction of the direct stream from Duncansby Head. Six miles off Kinnaird Head the stream runs to the southward till 2, and at 12 miles till 3 o'clock, or till 40 minutes after high water at Leith.

Off Buchanness the stream attains its greatest strength, namely 4 knots on the springs, and  $2\frac{1}{2}$  on the neaps; but off Newburgh it decreases to less than 2 knots, and ceases at 2 o'clock; and at 4 or 5 leagues in the offing it runs till 3 o'clock, or 40 minutes after high water at Leith.

The stream runs past Girdleness till 2h. 30m., or 10m. after high water at Leith; springs at the rate of  $2\frac{1}{2}$ , neaps  $1\frac{1}{2}$  knots. It runs across the mouth of Montrose Harbour and past Red Head till 3 o'clock, or 40 minutes after high water at Leith. From Red Head it sets into St. Andrews Bay till the last quarter, which sets S. and S.S.E.; but to the westward of Red Head it sets W.S.W. past Arbroath and over the Tay Bar.

At 2 miles without the Bell Rock Lighthouse the flood continues running to the southward till 2h. 55m. after high water at Leith; but between the Bell Rock and Fifeness it changes 2 hours earlier. The first part of the latter stream sets towards May Island, the middle to the South, and the last part S.S.E. The first part of the ebb sets from E.N.E. to N.E., the middle N.N.E., and the last part more northerly.

About a mile off St. Abbs Head the flood stream runs to the south-eastward till 2h. 55m. after high water at Leith; but at  $5\frac{1}{2}$  or 6 leagues in the offing it continues a quarter of an hour later. About 3 miles off Berwick it runs till 4h. 10m. after high water at Leith.

At 5 miles off North Sunderland Point, and at the same distance south-eastward of the Staples, the flood stream continues till 3h. 25m. after high water at Leith.

About 2 miles off Blyth Harbour, and 4 miles off Tynemouth, it runs to the southward till 3h. 40m. after high water at Leith; and at 4 miles off Sunderland, a quarter of an hour later.

At 3 or 4 miles off Hartlepool, and at the same distance off Whitby the flood stream runs to the southward till 4h. 10m. after high water at Leith; and at the same distance off Flamborough Head it continues to run half an hour longer.

in the Norfolk and Suffolk coasts the streams of tide run nearly parallel to the shore. Off Wells the flood runs to the eastward till slack, or three hours after high water on the shore.

Four miles off Cromer, and the same distance off Hasborough, the flood runs along shore to the southward till 10h. 15m., or 1h. 45m. after high water at Harwich, and the ebb in a contrary direction.

2½ miles off Lowestoft the flood stream continues to run to the eastward till 1h. 30m. before high water at Harwich.

Orfordness the flood stream continues to run till about high water at Harwich Harbour; the flood sets W.S.W., and the ebb E.N.E.

Margate it is high water about 1h. 40m. by the ground. Near the first buoy of Margate Sand, at the first of the flood, on the shore the stream sets S. by W., veering westward, till about half flood, or 1h. 15m., it sets west, and continues veering, till at high water it falls at N.N.W. The ebb stream begins at N.E., veering eastward, increasing in strength till about half ebb, or 2h. 45m., when it sets E. by E., still veering, and the latter part with diminished strength, till at low water it falls slack at south.

In the River Medway the flood stream runs up in mid-channel from the Dock-Yard to twenty-five minutes after high water at Sheerness Dock-Yard; the Nore Light Vessel, although it is high water by the ground arrives earlier than at the Dock-Yard, yet the stream runs up the river for half an hour after high water at the Yard.

It remains to be noticed that the direction of strong winds, as well as the varying pressure of the atmosphere, considerably affect both the times and the heights of high water. Thus in the North Sea a strong V. gale and a low barometer raise the surface 2 or 3 feet higher, and use the tide to flow all along the coast from the Pentland Firth to the mouth of the river half an hour longer than the times and heights predicted in the tables. Easterly, S.E., and S.W. winds produce opposite effects, and will be felt as far down the Channel as Dungeness. On the other hand, at the entrance of the Channel, at Plymouth, and as far up as the Bristol Channel, south-westerly winds, with a low barometer, raise the surface of the water; and north-easterly winds and a high barometer always lower it.

These winds affect also the locality of the meeting of the North Sea and Channel tides: during moderate breezes this takes place somewhere between the North Foreland and the north end of the Goodwin Sands, and between the Kentish Knock and the Galloper to the southward; but both these places of meeting are liable to be removed to the south or north by strong northerly or south-westerly winds.

## THE TIDES AMONG THE ORKNEYS.

BY CAPTAIN F. W. L. THOMAS, R.N.

The great rapidity of the tidal streams among the Orkneys makes a correct knowledge of their periods and velocities of the utmost importance to the mariner. *General Remarks.*

In the terrific gales which usually occur four or five times in every week all distinction between air and water is lost, the nearest objects are obscured by spray, and everything seems enveloped in a thick fog; upon the open coast the sea rises at once, and striking upon the rocky shores, rises in foam for several hundred feet, and spreads over the whole country.

The sea, however, is not so heavy in the violent gales of short continuance as when an ordinary gale has been blowing for many days; the whole force of the Atlantic is then beating against the Orcadian

shores, rocks of many tons in weight are lifted from their beds, and the roar of the surge may be heard for twenty miles; the breakers rise to the height of sixty feet, and on the North Shoal, which lies 8 miles N.W. of Costa Head, the broken sea is visible even at Skail and Birsá.

Similar effects may be witnessed in any stormy region, but here they are increased by the power of the tidal stream, and when the whole mass of water is in motion, a very slight inequality at the bottom of the sea is indicated by a ripple on the surface, so that by these means I have detected shoal spots (to the eastward of North Ronaldsha) at a depth of 47 fathoms, though the difference in depth was but 20 feet. On the rocky bank of the North Shoal, which is about 4 miles in length, the ripple readily distinguished any inequality of 10 and 15 feet, at a depth of 30 fathoms, even when the stream was moving but one mile per hour. It is only in calm or very fine weather that these rippings can be observed, but when the wind increases upon a weather tide the sea will break over every inequality of the sea bottom. These broken seas are dangerous, and during the survey of these Islands I have often been in great peril from moving the ship before sufficient time had elapsed for the sea to become quiet.

*Depth of the  
Tidal Stream.*

*High water  
at*

*Stromness,  
Pierowall,*

*Otters Wick,*

*Holm Sound.*

The body of the tide-wave comes from the N.W., and makes high water on the whole west coast of the Orkneys at nearly the same time; the establishment for Stromness being 9 o'clock, and that for Pierowall in Westra, is about 6 minutes later. At the north-east end of the Orkneys it is but a few minutes later than at the north-west, as the establishment for Otters Wick is 9h. 13m.; but the tide there is probably retarded by having to pass over the shoal water at the mouth of the bay.

On the south-east side of the Orkneys, in Holm Sound, the high water there being derived from the tide-wave entering by the Pentland Firth takes place about 9h. 35m.

The vulgar establishment, or time of high water, full and new moon, varies greatly; the mean of nine observations at Otters Wick gives 9h. 13m., but they vary between 8h. 58m. and 9h. 42m.

*Difference of  
Sea-level.*

When the tide has to pass through a narrow or shallow channel, the retardation is very great; thus it is high water an hour earlier at the mouth of Eynhallow Sound than at Kirkwall, though the distance is but 11 miles; and by levelling across Sanda (about half a mile), it appeared that when it was high water at Otters Wick, the sea-level was 4 feet 8 inches above the sea level of Catasand, and that high water was 1h. 43m. later at Catasand than at Otters Wick.

*Mean range at  
North Isles.*

The mean range of tide at springs in the North Isles of the Orkneys is 11 feet 2 inches, and at neaps 5 feet 6 inches.

*Semidiurnal  
inequality.*

Extraordinary springs may be 3 feet 4 inches above or below the mean; this result is greatly increased by the semidiurnal inequality; for in some instances the difference in the rise of two consecutive tides has been observed to amount to 2 feet 10 inches.

*South Isles.*

In the South Isles the mean range at springs is about 1 foot less than in the North, being 10 feet; at neaps 5 feet.

*Set of tide,  
Mull of Papa.*

The passage from the westward round the North end of the Orkneys is rendered somewhat treacherous by the peculiar set of the tide; for the body of the flood stream coming from the north-west, a ship must be 6 or 7 miles to the northward of the Mull of Papa to drift clear of North Ronaldsha. The first half of the flood sets from the Mull right for North Ronaldsha (S.E. b. E.  $\frac{1}{2}$  E.), and should the wind fail while the flood is running, there would be a great probability of drifting ashore.

*from Mull of  
Papa to North  
Ronaldsha.*

The flood stream passes slowly the North coast of Westra (sending a weak offset between Papa and Aikerness), and joins the main

eam off Moul Head, where a bore or *röst*\* is formed, which stretches several miles to sea. The tide here runs about 6 knots; between Papa 1 North Ronaldsha 3 knots; but near North Ronaldsha the rate again increases to 6 knots, passing over the Altars of Linnay and Sealerry with great violence. The flood splits on the West coast of North Ronaldsha with the Established Kirk (the southernmost) in one half a small byre; and should a vessel be drifting down on the island, she should endeavour to pass to the southward, when she will go clear everything.

*Bore off Papa  
Rate of Tide.*

Off Seal Skerry there is a bad *röst* with southerly winds, and the tide runs at six knots between that point and Dennis Head; it does not, however, touch the shore, but leaves a small eddy or counter-tide, where boats can turn up as far as the Skerry.

*Seal Skerry  
Röst.  
North  
Ronaldsha.*

The tide sets strongly between Fair Isle and the Orkneys. For on one occasion having Dennis Head bearing S.  $\frac{1}{4}$  E. distant 8 miles, the flood having set S.E.  $\frac{3}{4}$  S. for three hours, and being then high water on the shore, it shifted its direction  $3\frac{1}{2}$  points; that is, it set South for the next three hours, or until it was half-ebb on the shore, its greatest rate having been 3 to 4 knots. An hour before this, the vessel's track began to take a curved form, which continued to grow sharper as the rate of tide decreased, so that without any stopping, we found ourselves drifting with the ebb stream North, and parallel to, but at the distance of 2 miles from, our former track. The ebb stream continued steadily North for four hours, running 2.8 at its strength, after which it began to curve to the eastward; the stream thus appearing to describe a long arc, and revolving in the direction of the hands of a watch.

*Tide Streams  
between Fair  
Isle and the  
Orkneys.*

It also appears that when it is half-flood on the shore, it is slack water in the stream; that when it is low water on the shore, the flood stream is running strongest, but changing its direction from S.E.  $\frac{3}{4}$  S. South, and that the reverse happens during ebb tide.

*Tide and half-  
tide.*

These observations will show how little dependence can be placed on a direct course among these treacherous tides; and those who have been beating about for some days against a head wind are particularly exposed to this danger. It is a common remark with the people of North Ronaldsha, that all vessels come ashore with the flood ebb; and it is readily seen how this takes place, for the accident of it being either flood or ebb tide will make a difference of between 30 and 40 miles in position.

The flood stream from Runabrage sets into North Ronaldsha firth at the rate of 3 knots; from the Holms of Eyre it sets over the Baas of Eran, and both streams passing through the firth at the rate of 4 knots, continue to run two hours after high water on the shore.

*North  
Ronaldsha  
Firth.*

Off the Start the first of the flood sets to the southward at 4, but changes, as the stream grows older, to S.W. There is an extremely strong *röst* off the Start with southerly winds and flood tide; it stretching for 4 miles to sea, but being heaviest near the shore.

*Start of Sanda.*

*Röst.*

Between Westra and Sanda the stream is scarcely sensible, but increasing strength as it approaches Calf Sound and Lashy Sound, it rushes through those narrow passes at the rate of 6 knots; but decreasing to 2 or 3 knots in Eda Sound, where the stream falls into the Emsa Firth. In those Sounds the stream runs  $1\frac{1}{2}$  hours after it is high water on the shore.

*Calf and Lashy  
Sounds.*

In Spurness Sound the tide begins to the eastward half-an hour before low water on the shore, or  $1\frac{3}{4}$  hours before it is low water in the bay, and turning every six hours. This stream is like a mill-race in

*Spurness  
Sound.*

*st* (pronounced *reust*) a Scandinavian word, meaning a roaring, broken, tidal sea.

- the narrows when passing Spur Ness, but it speedily becomes diffused in Sanda Sound, and off Kettletaft it scarcely runs 2 knots.
- Stronsa and Westra Firths.* In the Stronsa and Westra Firths, which form one continuous and nearly straight channel, the tide stream is very rapid, as through them and Enhallow Sound the body of the ocean tide is discharged.
- North Shoal.* At the North Shoal, which is 15 miles from the entrance of the Firth, the tide sets W. by S. (towards the entrance), and at springs scarcely runs 2 miles an hour; neaps about one.
- Brough of Birsa.* Along the coast of West Mainland, or Pomona, the stream is only sensible off the points; but off the Brough of Birsa the flood stream sets to the northward for two hours after it is high water on the shore when its greatest rate is 2 knots.
- West coast of Rowsa.* From the Brough of Birsa the flood sets along shore for Costa and Sacquoy Heads, increasing in velocity as it approaches the Westra Firth. The influence of the indraught through Eynhallow Sound is scarcely felt beyond a line joining Costa Head and the Reef of Quendale.
- Skea Skerries.* The flood stream runs South along the West coast of Westra, from the Noup to the point of Skea, and over the Skea Skerries. Between them and Rowsa the stream acquires great force, even 6 knots, and does not turn for two hours after high water on the shore. Its chief weight passes close round Kili Holm, and crosses for War Ness, (the South Point of Eda,) and the Greenholms.
- Kili Holm. War Ness.* At War Ness the tide stream runs 7 knots, and the rest is quite impassable during southerly gales and spring flood. At that time the Sound between the Gio Ness of Shapinsha and War Ness is in violent commotion, and when bound to Stronsa, a line of breakers may sometimes be seen roaring and foaming within half a cable's length, while vainly looking for a gap or smooth.
- Stronsa Firth.* The main stream from War Ness, joined by the Stream from Eda Sound, sets past Rousholm Head, and clear of Auskerry to the open sea; and from the Greenholms, past Shapinsha and Deerness, where it is joined by the String, the usual name for the direct run of the stream from Eynhallow Sound by Gairra, Eller Holm, and Deerness. Its rate between Shapinsha and Rousholm is 6 knots, and between the Mull of Deerness and Auskerry about 4 knots.
- Weatherness and Fara Ness Sounds.* The tides in Weatherness and Fara Ness Sounds are peculiar; the stream turns to the eastward as soon as the tide has ceased to fall upon the shore; that is, the flood stream makes  $2\frac{1}{2}$  hours before it does in Westra Firth. The stream pours through the narrows of Weatherness and Fara Ness Sounds at the rate of 4 knots, and then sets very weakly towards Calf Sound.
- Egilsha and Shapinsha.* A very weak stream runs south through Howan Sound during the flood, and it is also weak on the East side of Egilsha; for the body of the stream goes transversely across the channel, and leaves comparatively still water along Egilsha and the North side of Shapinsha.
- Sound.* The flood stream from Costa Head and the reef of Quendale runs towards Eynhallow, and divides there, passing Burgher and the Wael Race at the rate of 7 knots; the streams unite when past the island, but do not average more than 4 knots down Eynhallow Sound.
- Wyre Sound. Swine Holm.* A very weak stream passes eastwards through Wyre Sound, and another South of Wyre island; but off Swine Holm, where the latter stream unites with that from the Westra Firth, the rate scarcely equals 2 knots. In the narrow channels among the group of Holms between Gairra and Shapinsha, the flood sets southerly 6 knots.
- Between Gairra and Shapinsha and by Work Head.* The main stream from Eynhallow Sound passes S. of Gairra and thence transversely to Stromberry Head, and on through Shapinsha Sound. The tide stream is narrow in its passage between Work Head and Eller Holm, nor does the *String* expand for some distance after



The directions as well as the velocities of the tidal streams in the Pentland Firth vary with the hour of the tide; and in almost every case the flood takes a more southerly direction as the tide grows older, and the contrary with the ebb.

*Rate.* The flood stream comes South along the shore of Hoy, and East along the coast of Caithness; and the indraught increases in approaching the entrance. Between Turn Ness and Dunnet Head the usual springs rate is 7 knots, but as they round the South end of Swona and North end of Stroma, it rises to 9 knots, and when rushing past the Great Lother to 10. About  $1\frac{1}{2}$  hours after it is high water on the shore, the flood stream makes strong along the coast of South Walls, and curving to the northward of Swona, washes the Great Lother, and passes to the northward of the Pentland Skerries.

*Direction.* At a later period of the tide, the stream from Brims Ness goes direct to the South end of Swona and to the Southward of the Pentland Skerries; so that after it is half flood in the stream (equal to high water on the shore), if a ship is a mile to the southward of Brims Ness, she will pass a mile to the southward of Swona, and the same distance to the southward of the Skerries.

*Hoxa Sound.* From Cantick Head the flood stream sets past Stangar Head, and crossing Hoxa Sound divides on the Lime Kiln; one very weak stream setting to the southward along South Ronaldsha, while the other runs about 4 knots towards Water and Holm Sounds.

*Holm Sound.* Through Holm Sound the rate of the stream is 6 knots where strongest, and it turns at one hour after it is high water on the shore. The rate through Water Sound is 4 knots.

*Water Sound.* From Cantick Head a weak stream runs northwards, filling Long  
*Cantick Sound.* Hope and the bays on the east side of Hoy, and finding outlets through  
*East side of* Gutter and Weddel Sounds; the rate at springs in the narrowest part  
*Hoy.* of these Sounds is 2 knots.

*Pentland Firth;* Between Cantick Head and Swona the general direction of the stream  
*round Swona ;* is towards South Ronaldsha, and southward between it and Swona; but it is almost impossible to predict exactly what direction a drifting vessel would take; with Barth Head open North of Swona, the first quarter flood would send her to the northward of that island, and through the mid-channel between it and South Ronaldsha; but the half flood would probably press her too close to Barth Head, and perhaps on the Great Lother.

*from Widewall.* The first of the flood stream from Widewall sets direct on Barth Head and the Lother, so that in light winds vessels should in all cases pass as near to the North Head of Swona as possible. As a general rule, if a ship, having left Widewall with light winds and flood tide, should drift nearer to Swona than Barth Head, she will be likely to clear the Lother—if nearer to Barth Head, she will go too close to that rock.

*Pentland* When the flood stream first makes at the north head of Swona, it  
*Skerries.* first sets across the channel, but presently turns to the southward, passing clear of the Lother, and then to the northward of the Pentland Skerries; but after half flood in the stream, equal to high water on the shore, the stream from the north end of Swona bends round to the southward of these islands, and consequently, at a certain period of the tide, sets towards them.

Between the Lother and the Skerries the flood stream sets fair out to sea, about E.S.E., joining the main stream from Stronsa Firth.

From the South end of Swona the first flood sets right on the Great Skerry, dividing there, and running 7 knots close to the North rocks. On the South side the stream sets off (leaving a narrow eddy inside), at first towards the Little Skerry, but it gradually curves and goes clear of

**Clette.** A vessel, however, must be very near the Great Skerry to *ift* in that direction; if only half way between the Great and Little Skerries she would infallibly drive upon the rocks, where the current runs like a mill-stream. It must be observed, that the general tendency of the flood-stream is to set clear to the westward of the Skerries, and that a vessel must be very near the opening between the Great and Little Skerries before she would feel its indraught. After half tide in the stream, the set of flood from Swona goes well clear to the southward of the Pentland Skerries.

I cannot state with the same personal confidence the direction of the streams of tide on the South side of the Pentland Firth, but the experiments of Capt. Otter show that the flood stream from Dunnet Head and St. Johns Point has a tendency to pass to the northward of Stroma, so that a buoy set adrift within half a mile of Mey Bay will not float through Inner Sound, but rather drift on shore on the west side of Stroma; and from this it would appear that a vessel one mile to the northward of Dunnet Head, with strong flood, will go well clear to the northward of Swona. *Inner Sound.*

The last of the flood stream is pressed down upon Duncansby Head, where it does not cease running till 4 hours ebb on the shore; for which reason, when a vessel is turning up from the southward, she should rather endeavour to enter the Firth upon the North side, when she will usually be able to get as far as Brough Ness while the flood is still running. *Duncansby Head.*

There are large eddies under Stroma and Swona with the flood, and where they meet the main stream little whirlpools are produced, which credulity has exaggerated into objects of importance; on rare occasions they might be dangerous to boats. *Eddies of Swona and Stroma.*

It is almost still water to the eastward of the Skerries during flood, and a large eddy is formed between the Great Lother and Old Head, commencing at half-flood on the shore; it is called Liddel Eddy, from a farm of that name in South Ronaldsha. *Eddies of Pentland Skerries; and Liddel Eddy.*

Wherever the tide stream is rapid past any point there is always an eddy on the opposite side, and these eddies increase as the tide grows older, till at last only a narrow stream of the former tide is left; this may be well witnessed in Hoy Sound, where the flood stream is sometimes diminished by the encroaching ebb to 20 and 30 feet in breadth.

The indraught of the ebb stream to the Pentland Firth is felt at a considerable distance from the entrance, so that vessels leaving the Mull of Deerness in calm weather are sometimes drifted into the Pentland Firth. From Copinsha the stream runs nine hours to the southward, from half flood on the shore to low water; but its rate is slow, never exceeding 2 knots, except near Old Head, where it runs four. *Ebb stream,*

There is not much danger to be apprehended from the ebb stream in the Pentland Firth when it has made strong; about 3 hours after low water on the shore, it sets fairly through between Duncansby Head and the Skerries, between Swona and Stroma, and over towards Hoy; and a vessel must be far within a line joining Duncansby Head and the North end of Stroma, to feel the indraught of the Inner Sound; for a buoy that has drifted through that Sound with the flood stream will not return with the ebb. *in the Firth.*

Round Brough Ness the ebb pours with great violence, and over the ail of the Great Lother, where several vessels have thereby been lost. *Great Lother.*

The stream from the North side of the Pentland Skerry sets upon Swona, dividing upon the South Clette; but the last part of the ebb will go to the northward, between Barth Head and Swona. *Swona.*

From the North Head of Swona the first ebb goes towards Brims Ness, the last towards Switha. There is a very large eddy under Swona *Eddy.*



during ebb tide, which before the tide is done almost reaches as far as Cantick Head.

*Eddy of  
Stroma.*

The ebb stream sets fairly through the Firth from the North end of Stroma till it meets the stream coming from Inner Sound and incloses a large eddy; at half tide these united streams set over toward Turn Ness, where the last of the ebb tide drains, while there is comparatively still water on the South side, between Dunnet Head and St. Johns Point.

It does not appear necessary to follow the course of the ebb stream throughout the Orkneys, as in almost every case it is the reverse of the flood, nor to enter into detail of those phenomena which are common to all masses of water in motion, and which any one, by observing the directions of the channels and the apparent obstructions of the several streams, can learn from the chart.

#### REMARKS ON THE SET OF THE TIDAL STREAMS IN THE IRISH AND ENGLISH CHANNELS, AND IN THE NORTH SEA.—BY REAR-ADMIRAL F. W. BEECHEY, F.R.S.

*The Common  
Standard for  
the turn of the  
Streams*

A CAREFUL investigation of the tides in the Irish Channel, the English Channel, and in the North Sea, has shown the possibility of referring the movements of the several streams to a common standard, instead of resorting to the troublesome process hitherto in use, of comparing the motion of the streams with the varying times of high water along the coast.

*is High Water  
at Dover and  
Liverpool.*

For the entrance of the English Channel and North Sea the time of high water at Dover may be considered the standard; and for the whole of the Irish Channel, the time of high water on the shore at the entrance of Liverpool.

*Off mouth of  
English  
Channel.*

Off the mouth of the English Channel the stream, although materially influenced by the indraft and outset of the Channel, will be found running to the *northward and eastward*, while the water is *falling* at Dover; and to the *southward and westward* while it is *rising* at that port. The particular direction given to the stream in this part of the sea, by the meeting of the Channel and of the offing tides, will be shown in the following table (Compartment I.); and it is only necessary to mention here, that to the southward of the parallel of Scilly, the tides of the Channel and offing blend together with varying force and direction, and occasion the stream to be constantly changing, and in some places even to make the entire circuit of the compass in one tide, without ever remaining long upon any one point. So that any written description of their course is rendered almost impossible, and the table alone must be consulted for the direction at any particular hour. From this revolving motion of the stream, it has been asserted that a vessel can never be carried far in any one direction by the tide. Such, however, is not the case; for, although it may be true that while at anchor in a particular spot the vessel's head will turn to every point of the compass, yet directly she is loose she will be carried away upon a rhomb depending upon the state of the tide at Dover.

*South of Scilly.*

*Bristol Channel.*

From the parallel of Scilly to the Bristol Channel the stream is more regular, and while the water is *falling* at Dover, will be found setting to the *northward*: near the coast partaking of the direction of the shore, and turning sharply round Trevoise Head and Hartland Point into the Bristol

Channel; and while the water is *rising* at Dover, setting as sharply out of the Bristol Channel and along the land towards Scilly.

By many observations, the Light vessel at the Seven Stones has been found to swing to the *northern* tide 7 minutes after high water at Dover; and at Trevoze Head the northern tide to make 12 minutes after Dover. And as a vessel advances up the Bristol Channel the stream turns progressively later. The tides of that estuary do not follow the same law exactly as the tides of channels which are open at both extremities. The directions of the stream in the Bristol Channel will be given hereafter; at present I wish to draw the attention of the seamen to the particular fact, that while the stream from Scilly is setting to the *northward* the stream from the Irish Channel will be found setting to the *southward*, and that these streams meet off the entrance of the Bristol Channel in about the parallel of  $51^{\circ}00'$  where both turn into that channel. As a general rule, in all the space eastward of a direct line joining Scilly and the Tuskar, the stream will be found running to the eastward towards the Bristol Channel, while the water is *falling* at Dover and Liverpool, and *vice versd*, setting to the *north-east* on the southern side of the Channel and to the *south-east* on the northern side. Such is the general set of the stream in this part of the sea, which I have given in general terms to show that to the eastward of the line above mentioned a strong indraft towards the Bristol Channel will always be experienced while the water is falling at Liverpool, and *vice versâ*. To the westward of this line the tides appear to be slack; but we are in want of further observations in all this part before any particulars can be entered into. Towards Cape Clear the northern stream from Scilly seems to join the southern and western streams from the Irish Channel, and both pass to the north-west round Cape Clear, and *vice versd*.

Seven Stones.

Meeting of the  
Stream in  
 $51^{\circ} N$ .

Streams between  
Scilly and  
Tuskar.

Off S. coast of  
Ireland.

At the Smalls Lighthouse it is slack water 5 minutes before high water at the entrance of Liverpool; the stream sets past the rock in a S. by W.  $\frac{1}{2}$  W. direction while the water is *falling* at Liverpool, and N. by E.  $\frac{1}{2}$  E. while it is *rising* there, veering to N. by E. during the two last hours of the tide. The strength of the tide is sensibly felt hereabout and all the way from the Smalls to Pembroke, running upwards of  $3\frac{1}{2}$  or 4 knots at the height of the springs. To the southward of the Smalls the stream sweeps round in a broad curve to the S.E., and enters the Bristol Channel while the water is *falling* at Liverpool and *vice versd*, as before stated. The *entrance of* Liverpool is properly the standard to which the turn of the stream in these pages is referred, and wherever a reference is made to that place it must be understood as being 18 minutes *earlier* than the time of high water at St. Georges Pier, to which the tide tables are adapted.

Off the Smalls.

On the Irish side, at the Saltees Lightship, for instance, the water is slack 22 minutes before it is high water at Liverpool entrance. The stream sets W.S.W. from a quarter of an hour before high water at Liverpool entrance to  $1\frac{1}{2}$  hours after, and then W.N.W. to low water. The flood or *rising tide* at Liverpool sets past the Saltees for the first 3 hours E. by S., then E.S.E. for the 2 next hours, and S.E. by E. for the last hour, when the tide slacks, as before, 22 minutes before high water at Liverpool entrance.

Off the Saltees.

From the Saltees Lightvessel to the Tuskar the stream sets along the land, but towards Carnsore Point begins to tend to the northward on the flood, and finally sets sharply round that point into the Irish Channel, and must be carefully watched by vessels in this situation.

Off Carnsore  
Point.

## SECTION I.

## THE TIDAL STREAMS OF THE IRISH CHANNEL, WITH TABLES SHOWING THEIR COURSE AND RATE WHEN AT THEIR GREATEST STRENGTH.

*Streams turn with the tides of Liverpool and Morecambe Bay.*

IN the Irish Channel, as before observed, experiments have shown that, notwithstanding the variety of times of high water throughout the Channel, the turn of the stream over all that part which may be called the fair navigable portion of the Channel is nearly simultaneous; that the northern and southern streams in both Channels commence and end in all parts (practically speaking) at nearly the same time; and that that time happens to correspond nearly with the time of high and low water on the shore at the *entrance* of Liverpool and of Morecambe Bay,\* a spot remarkable as being the point where the opposite tides coming round the extremities of Ireland terminate. So that it is necessary only to know the times of high and low water at either of these places, to determine the hour when the stream of either *tide will commence or terminate in any part of the Channel*. For this purpose the Liverpool tide-table may be used, subtracting 18 minutes from the times there given, in consequence of the high water at St. Georges Pier being later than the point which is considered as the head of the tide, and which will be found fully explained at page 125.

*Streams enter N. and S. of Ireland.*

The tide from the Atlantic enters the Irish Channel by two channels; of which Carnsore Point, the S.E. point of Ireland, and St. Davids Head, the S.W. point of Wales, are the limits of the southern one; and Rathlin and the Mull of Cantyre the boundaries of the northern.

*Southern streams from Tuskar to the Isle of Man.*

The *central portion of the stream* of flood or *ingoing* stream, runs nearly in a line from a point midway between the Tuskar and the Bishops, to a position 16 miles due west of Holyhead; beyond which it begins to expand eastward and westward; but its main body preserves its direction straight forward towards the Calf of Man, which it passes to the eastward with increased velocity as far as Langness Point, and then at a more moderate rate on towards Maughold Head. Here it is arrested by the flood or southern stream from the North Channel coming round the Point of Ayr, and is first turned round to the eastward by it, and then goes on with it at an easy rate direct for Morecambe Bay; thus changing its direction nearly eight points.

*Eastern Branch of S. stream sets into Cardigan Bay.*

The *outer portions* of the stream are necessarily deflected from the course of the great body of the water by the impediments of banks on the Irish side of the Channel, and by the tortuous form of the coast on the Welsh. The eastern portion passing Linney Head, rushes with great rapidity between the Smalls, Grassholm, and Milford Haven towards the Bishops, which it passes at a rate of between 4 and 5 knots; sets sharply round those rocks in an E.N.E. direction right over the Bass Bank, and into Cardigan Bay; makes the circuit of that Bay, and sets out again towards Bardsey, at the other extremity of it; then sweeping to the N. by W. past the island and through the Sound, it gradually takes the course of the shore, round Caernarvon Bay, filling the Menai Strait as far as Bangor; but the stream still continuing outside towards the South Stack, which it rounds, setting towards the Skerries at a rate of upwards of 4 knots; and, finally, turns sharp round those rocks for

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\* The entrances of Liverpool and of Morecambe Bay are, as before stated, 18 minutes earlier in their times of high water, than those given for Liverpool in the tide-tables.

Liverpool and Morecambe Bay; completing in its way the high water in the Menai, and filling the Dee, the Mersey, and the Ribble.

The *western portion of the stream*, after passing the Saltees, runs nearly in the direction of the Tuskar, sets sharply round it, and then takes a N.E.  $\frac{1}{2}$  N. direction, setting fairly along the coast, but over the banks skirting the shore, so that vessels tacking near the inner edge of the sands in the flood, and on the outer edge on the ebb, have been carried upon them and lost, especially upon the Arklow and Codling Banks. Abreast of the Arklow is situated that remarkable spot in the Irish Channel, where the tide scarcely either rises or falls. The stream notwithstanding sweeps past it at the rate of 4 knots at the springs, and reaches the parallel of Wicklow Head. Here it encounters an extensive projection of the Codling bank; and while the outer portion takes the circuit of the bank, the inner stream sweeps over it, occasioning an over fall and strong rippling all round the edge, by which the bank may generally be discovered. Beyond this point the streams unite and flow on towards Howth and Lambay, growing gradually weaker as they proceed, until they ultimately expend themselves in a large space of still water situated between the Isle of Man and Carlingford. There we have not been able to detect any stream; for there another remarkable phenomenon occurs—the water rising and falling without having any perceptible stream. This space of still water is marked by a bottom of blue mud. Such is the course of the flowing water of the Southern Channel.

*Western Branch sets over the Irish banks.*

*Off Arklow, no rise or fall.*

*Codling Bank.*

*Stream ends off Carlingford. No stream there.*

In the North Channel the stream enters between the Mull of Cantyre and Rathlin Island simultaneously with that passing the Tuskar into the Southern Channel, but flows in the contrary direction. It runs at the rate of 3 knots at the springs, increasing to 5 knots near the Mull, and to 4 near Tor Point on the opposite side of the channel. The eastern branch of this stream turns round the Mull towards Ailsa and the Clyde, a portion passing round Sanda up Kilbrennen Sound and Loch Fyne. The main body sweeps to the S. by E., taking nearly the general direction of the Channel, but pressing more heavily on the Wigtonshire coast; off which it has scooped out a remarkable ditch, upwards of 20 miles long by about a mile only in breadth, in which the depth is from 70 to 100 fathoms greater than that of the general level of the bottom about it. Near the Mull of Galloway the stream increases in velocity to 5 knots; the eastern portion turns sharply round the promontory towards the Solway, and splits off St. Bees Head, one portion running up the Solway, and the other towards Morecambe Bay.

*Northern Stream from Rathlin to the Clyde.*

The *central portion* midway between the Mull of Galloway and the Copeland Island presses on towards the northern half of the Isle of Man; and while one portion of it flows towards the Point of Ayr, the other makes for Contrary Head, and is there turned back to the N.E. at a right angle nearly to its early course. Passing Jurby Point, it re-unites with the other portion of the stream and they jointly rush with a rapidity of from 4 to 5 knots round the Point of Ayr, and directly across all the banks lying off there, and catching up the stream from the south channel off Maughold Head, they hurry on together towards that great point of union, Morecambe Bay. This bay, the grand receptacle of the streams from both Channels, is notorious for its huge banks of sand, and also remarkable for a deep channel scoured out by the stream, and known as the Lune Deep, which is the great beacon to all vessels bound to that place.

*Central portion of this stream sets to Isle of Man and Morecambe Bay.*

*Lune Deep.*

We have now only to speak of the *western limit* of the stream, which was left off Tor Point running at a rate of 4 knots off the pitch of the point. Hence it strikes directly towards the Maidens, boiling over the Highlander and Russel Rocks, and other reefs in the vicinity of that

*Western branch of N. stream to Maidens and Belfast.*

dangerous group; and takes the direction of the coast again from Muck Island to Black Head, at the entrance of the Lough of Belfast, which it fills.

*Belfast Lough.* The portion of the stream which sets into Belfast Lough splits off Grey Point; one portion flowing up towards Garmoyle, while the other bends back along the shore of Bangor, Groomsport, and Orlock, and blends with the general stream which has come on from the Maidens and Blackhead in nearly a straight line, and passes with it through the sounds of the Copeland Islands. Hence it proceeds along the coast, brushes the South Rock, and runs on towards St. Johns Point; off which the stream, like that coming from the southward, expends itself in the large space of still water, which remains almost undisturbed, although pressed upon by streams from various quarters.

*Ingoing Streams.* Such is a general description of the streams in the Irish Channel, which are produced by the flowing of the water, or which, for the purpose of distinction, we may designate the *inging streams*.

*Outgoing Streams.* The ebbing or *outgoing streams* do not materially differ from the reverse of those, except that in the southern channel they press rather more over towards the Irish coast.

*Limits of the above Streams.* These observations do not, however, extend beyond the points where the Channels begin to open out, that is, beyond a line joining Rathlin and the Mull of Cantyre on the North, and the Saltees and Pembroke on the South. Outside of these limits, the waters diverge right and left; that on the north joining the stream from Jura, and turning sharp round Rathlin; that on the south, speaking now of the outgoing stream, sweeps past St. Davids Head into the Bristol Channel on one side, and on the other rounds the Tuskar, and passes on to Waterford.

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TABLE SHOWING THE MAGNETIC DIRECTION AND RATE (AT SPRINGS)  
OF THE TIDAL STREAMS IN THE IRISH CHANNEL.

In the following Table, the direction of the stream as it runs at the middle of the tide or at its greatest strength, is given at four places upon lines connecting well known headlands, viz., at 5 miles from the shore, on each side of the channel, and at a third of the distance across the channel from each of those headlands. The names of the places will be found in the marginal columns; and in the adjacent column, a brief description of the course of the streams in the immediate vicinity of each headland. The western part of the stream will be found on the left-hand page, and the eastern half on the right-hand page.

To use the table, take the line nearest to your position, and at the distance across the Channel which answers best to your distance from the land, take out the direction of the stream from its column; or if the place of the ship falls between two divisions, take the mean of the two directions given in the columns for the direction of the stream at that time. To know when the stream will turn, look in the Tide Tables for the time of high water at Liverpool, for the day, and about 15 minutes after that time the stream will begin to *set out* in both the North and the South Channels, and will run in that direction until about 45 minutes before low water, when the general slack water begins. The slack water in the offing is usually spread over an interval of an hour—from the cessation of one stream to the beginning of the next.

In these tables { F stands for *flood* or *rising* tide at Liverpool.  
E stands for *ebb* or *falling* tide at Liverpool.

As a rough general rule, in the fair way of the Channel a vessel will be carried 9 miles by the stream in a whole tide at springs, and at neaps about 6 miles; but near to the land on either side, or to the banks, the rate of the stream greatly increases.

The rates given in the table which follows are at spring tides; and in order to adapt them to neaps, one third may be subtracted from them.

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## TIDAL STREAMS

TABLE showing the DIRECTION and RATE (at SPRINGS)

Position.	Remarks on the Tides near the Land.	Magnetic Direction				
		From	5 Miles.	Rate.	1 over.	Rate.
On a line joining the Tuskar and St. David's Head.	The stream curves with the land and slacks in shore $1\frac{1}{2}$ hours before the offing, and inside the Long Bank $2\frac{1}{2}$ hours before Liverpool, the stream setting over the bank N. by W. & S. W.	Tuskar -	N.E. $\frac{3}{4}$ E. S.W. $\frac{3}{4}$ W.	3 3	N. E. by E. $\frac{1}{2}$ E. s. w. by w. $\frac{1}{2}$ w.	$2\frac{1}{2}$ F $2\frac{1}{2}$ E
On a line joining the Arklow Light Ship and Bardsey Island.	Near the Arklow bank the stream slacks half an hour before it does in the offing, and inside the Banks generally an hour and upwards before the offing.	Arklow Light Ship.	N.E. $\frac{1}{2}$ N. S.W. by S.	3·6 3·6	N.E. $\frac{1}{2}$ N. S.W. $\frac{1}{2}$ S.	$3\frac{1}{2}$ F $3\frac{1}{2}$ E
On a line joining the Kish Light Ship and Holyhead.	The stream slacks at the Kish upwards of half an hour before the offing, and then bends inwards, towards the bay, setting over the Kish bank; further in shore it turns $1\frac{1}{2}$ hours before the offing, and 2 hours close in shore.	Kish Light Ship.	N.N.E. S.S.W. $\frac{1}{2}$ W.	2·0 2	N.N.E. S.S.W. $\frac{1}{2}$ W.	$2\frac{1}{2}$ F $2\frac{1}{2}$ E

In approaching Holyhead be guarded against the tides which run very strong near the Headlands.

At 7 miles off the South Stack the stream runs  $2\frac{1}{2}$  knots at springs.

At 5 miles ditto ditto 3 to  $3\frac{1}{2}$  knots at springs.

At 2 miles ditto ditto 5 knots at springs.

The neaps run about two thirds of these rates. In the channel the direction of the flood is about N.E. by N., and near the Stack N.E. or N.E.  $\frac{1}{2}$  E. towards the Skerries. Off the Skerries, that is, outside them, the flood turns more easterly, or runs E.N.E., and to the northward of the Skerries due east, or E.  $\frac{1}{2}$  N.

Off the South Stack there is a race occasioned by the meeting of the tides, but increased by some uneven rocky ground off the Stack. It begins about the

Position.	Remarks on the Tides near the Land.	Magnetic Direction				
		From	5 Miles.	Rate.	1 over.	Rate.
On a line joining the Calf of Man and the Skerries.	The flood stream meets the northern stream close to the Calf, and both run along the land to the eastward.	Calf of Man.	E. $\frac{3}{4}$ S. W.N.W. $\frac{1}{2}$ W.	$2\frac{1}{2}$ $2\frac{1}{2}$	E. $\frac{1}{2}$ N. W. $\frac{1}{2}$ S.	$1\frac{1}{2}$ F $1\frac{1}{2}$ E
On a line joining Rockabill and the Calf of Man.	From Rockabill to the northward the stream sets fair, taking nearly the direction of the coast, and passes on to St. Johns Point, when it encounters the stream from the North Channel; near here the stream turns to the westward, and bends in taking the curve of Dundrum Bay, which must be guarded against.	Rockabill -	N. by E. S. by W.	1·0 $1\frac{1}{2}$	N.E. $\frac{1}{2}$ E. S.S.W.	$\frac{1}{2}$ F $\frac{1}{2}$ E

## of the TIDAL STREAMS in the IRISH CHANNEL.

of the Stream.				Remarks on the Tides near the Land.	Position.
1/2 over.	5 Miles.	From			
N.E. 1/4	Rate. 2 1/2	N.E. 1/2 E.	Rate. 3 1/2 to 4	The stream curves with the land, and the flood sets sharply into Cardigan Bay, sweeping more and more in as you near the land. There is consequently an in-draught into this bay on both ebb and flood.	On a line joining St. Davids Head and the Tuskar.
S.W. 1/2 W.	2 1/2	S.W. 1/2 W.	4		
N.E. by N.	3 1/2	N.N.E. 1/4 E.	3	The stream curves sharply round Bardsey, and slacks 1h. 20m. in the Bardsey Sound before it does in the offing; the flood setting strong into Caernarvon, and the ebb strong into Cardigan Bay, and <i>vice versa</i> .	On a line joining Bardsey Island and the Arklow Light Ship.
S.W. 1/4 S.	3	S.S.W. 1/4 W.	2 1/2		
N.N.E. 1/4 E.	2 1/2	N. by E. 1/4 E.	3 1/2	In passing Caernarvon Bay the stream curves with the bay more and more as you near the bight, setting into the bay on one side and out at the other end, near Holyhead Bay; the stream sets directly for the Skerries, sweeping into Holyhead Bay when inside a line, joining the North Stack and Skerries, and in the centre of the bay splits, one part setting sharply over the Platters and round Carmel Head, the other running for the Fenwick Rock and Penryn.	On a line joining Holyhead and Kish Light Ship.
S.W.	2 1/2	S.W. 1/4 S.	3		

first quarter ebb and flood, at first close in with the shore, and gradually increases in strength, extending to seaward in a direction between N.W. and W.S.W. from the lighthouse, according to time of tide; about the last quarter tide it begins to subside. With strong winds blowing against the tide, the race is heavy, especially about half tide, and even dangerous at that time to small deep laden vessels, so that they should either go outside altogether or pass between it and the Stack (close to the latter). North and N.W. winds occasion the heaviest seas; at a distance of 2 miles from the Stack the race is no longer felt, and by keeping the Skerries to the eastward of N.E. by E. 1/2 E. a vessel will pass outside of it. Off the North Stack also there is a race after half tide, and although not dangerous at any time, it had better be kept clear of in heavy weather, as the seas break short.

of the Stream.				Remarks on the Tides near the Land.	Position.
1/2 over.	5 Miles.	From			
East W. by S.	Rate. 2 1/2	E. 1/2 N. W. 1/2 S.	Rate. 3 3	From the Skerries the stream sweeps over the Coal Rock, and runs on thence to Lynus and Liverpool in nearly a direct line; but at 10 miles off shore it takes a more northerly direction, and strikes off for the Ribble and Morecambe Bay; near Lynus it curves to the southward, and runs for Priestholm and Great Orme Head; at half tide the stream slacks in Red Bay, and turns to the northward, and off Lynus meets the true tide, and forms a race.	On a line joining the Skerries and the Calf of Man.
E. 1/2 N. W. by S.	1 1/2	S.E. by E. N.N.W. 1/4 W.	2 1 1/2		
E. 1/2 N. W. by S.	1 1/2	S.E. by E. N.N.W. 1/4 W.	2 1 1/2	Near the Calf, and to the northward, the flood sets to the southward, and the ebb to the northward; between the Calf and Rockabill the stream is very slack, being scarcely perceptible midway.	On a line joining the Calf of Man and Rockabill.



## TIDAL STREAMS

TABLE showing the DIRECTION and RATE (at SPRINGS)

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.	$\frac{1}{2}$ over.			
On a line joining Calf of Man and Walney Island.	Near the Calf, and eastward to Langness Point, the stream runs strong, and near the land bends to the northward, and passes Douglass Head on to Manghold Head, where it is turned to the East and S.E. by the northern stream.	Calf of Man	E. $\frac{1}{2}$ N. W. $\frac{1}{2}$ N.	Rate. $3\frac{1}{2}$ $3\frac{1}{2}$	East West	Rate. 2 2	F E
On a line joining St. Johns Point and Peel (Isle of Man).	The streams from the north and south channels meet off St. Johns Point. Near the land the stream runs 2 knots at springs, but at a distance there is scarcely any tide. Off the mouth of Lough Strangford, on a south bearing, the outset will be felt at a distance of $3\frac{1}{2}$ miles, sweeping in a curve to the N.E. with the ebb, and to the S.W. with the first of the flood, forming a race: the outset continues to run 2 hours after low water.	St. Johns Point.	s.w. by w. $\frac{1}{2}$ w. N.E. by E.	$1\frac{1}{2}$ $1\frac{1}{2}$	S.W. $\frac{1}{2}$ W. N.E. $\frac{1}{2}$ N.	$0\frac{1}{2}$ Drain	F E
On a line joining Peel and Mull of Galloway.	- - -	Peel -	E. $\frac{1}{2}$ N. W. $\frac{1}{2}$ N.	1 $1\frac{1}{2}$	E. by S. W.N.W. $\frac{3}{4}$ W.	$1\frac{1}{2}$ $1\frac{1}{2}$	F E

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.	$\frac{1}{2}$ over.			
On a line joining the Point of Ayr and Burrow Head.	Near the Point of Ayr, in a N.N.W. direction, there is usually a race, especially on the ebb: it takes place upon a bank, which, although shallower than the parts about it, is not dangerous.	Point of Ayr	S.E. by E. $\frac{3}{4}$ E. W. by N.	Rate. $3\frac{1}{2}$ 3	E. $\frac{3}{4}$ S. W. by N.	Rate. $2\frac{1}{2}$ $3\frac{1}{2}$	F E
On a line joining the Point of Ayr and St. Bees Head.	- - -	Point of Ayr	S. $\frac{3}{4}$ E. N.N.W.	$2\frac{1}{2}$ $1\frac{1}{2}$	S. $\frac{3}{4}$ E. N.W. by N.	$2\frac{1}{2}$ 2	F E

On the line joining Point of Ayr and St. Bees Head are situated the Whitestone and King William Banks, which are very dangerous. The tide sets immediately over them, S. by E.  $\frac{1}{2}$  E., at a rapid rate, and ought to be carefully guarded against.

The stream sets round the Point of Ayr into Ramsey Bay about the time of low water at Liverpool, and sweeps over the Bahama Bank, and from thence

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.	$\frac{1}{2}$ over.			
On a line joining Copeland Island and Mull of Galloway.	- - -	Copeland Island.	S. $\frac{1}{2}$ E. N. $\frac{1}{2}$ W.	Rate. 2 2	S. by E. $\frac{1}{4}$ E. N. by W. $\frac{1}{4}$ W.	Rate. 2 $2\frac{1}{2}$	F E

## Magnetic Direction and Rate of the

After High Water at Liverpool.											
1 Hour.		2 Hours.		3 Hours.		4 Hours.		5 Hours.		6 Hours.	
Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
N. $\frac{1}{2}$ E.		North		N. by W. $\frac{1}{4}$ W.		N.N.W. $\frac{3}{4}$ W.		N.W. $\frac{1}{2}$ N.		S.W. $\frac{1}{2}$ W.	

of the TIDAL STREAMS in the IRISH CHANNEL—*continued.*

of the Stream.					Remarks on the Tides near the Land.	Position.	
	$\frac{1}{2}$ over.	5 Miles.		From			
F E	S.E. by E. $\frac{1}{2}$ E. W.N.W.	Rate. $1\frac{1}{2}$	S.E. $\frac{1}{2}$ S. N.W. $\frac{1}{2}$ W.	Rate. 2	Walney Island.	The stream sets sharply round Walney Island into Morecambe Bay.	On a line joining Walney Island and the Calf of Man.
F E	S. $\frac{1}{2}$ E. Slack	$0\frac{1}{2}$	S. $\frac{1}{2}$ W. N. $\frac{1}{2}$ W.	$1\frac{1}{2}$ $1\frac{1}{2}$	Peel	To the N.W. of Peel the stream divides; one part runs towards the Calf,	On a line joining Peel and St. Johns' Point.
the other turns to the N.E., passes Contrary Head, so called from the set of the tides off it, and runs with an increasing rate along the land to Jurby, and thence to the Point of Ayr.							
F E	E.S.E. $\frac{1}{2}$ E. N.W. by W. $\frac{1}{2}$ W.	$2\frac{1}{2}$ $2\frac{1}{2}$	E.S.E. $\frac{1}{2}$ E. N.W. by W.	$3\cdot0$ $3\frac{1}{2}$	Mull of Galloway.	Off the Mull of Galloway the stream attains its greatest strength, and occasions a race off the head; but there is usually a slack very close	On a line joining Mull of Galloway and Peel (Isle of Man).
to the shore, of which steamers who are acquainted take advantage. Between the Mull and Burrow Head the stream bends to the northward, and finally takes the curve of the bay of Luce, setting sharply into the bay round the Mull, and out round Burrow Head.							

of the Stream.			Remarks on the Tides near the Land.	Position.	
	5 Miles.	From			
F E	East W.N.W. $\frac{1}{2}$ W.	Rate. 4 4	BurrowHead	- - - - -	On a line joining Burrow Head and Point of Ayr.
F E	S.E. by S. N.W. $\frac{1}{2}$ N.	1 $\frac{1}{2}$	St.BeesHead	Between King William Bank and St. Bees Head the stream is slack, but near St. Bees begins to run, one part passing up the Solway, the other going on towards Walney.	On a line joining St. Bees Head and Point of Ayr.

passes on to Maughold Head, where it meets with the tide from the southern channel. At half flood the stream at the Bahama runs towards Ramsay, and then turns to the north-west the rest of the tide.\* A few miles westward of this spot, in latitude  $54^{\circ} 18' N.$  and longitude  $4^{\circ} W.$ , the streams from the Calf of Man, and that which had passed over the Whitestone Bank, meet and thence run directly for Walney Island.

of the Stream.			Remarks on the Tides near the Land.	Position.
	5 Miles.	From		
F	S.S.E. $\frac{1}{2}$ E	Rate. 3	Mull of Gal-	On a line joining Mull of Gallo- way and Cope- land Island.
E	N. by W. $\frac{1}{2}$ W.	3	loway.	

stream at the Bahama Light Vessel.

Before High Water at Liverpool.

5 Hours.		4 Hours.		3 Hours.		2 Hours.		1 Hour.	
Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
S. $\frac{1}{2}$ W.		S. $\frac{1}{2}$ W.		S.W.		N.W. $\frac{1}{2}$ W.		N. by E. $\frac{1}{2}$ E.	

\* See Bahama Light Vessel.

TABLE showing the DIRECTION and RATE (at SPRINGS)

## Copeland Islands and Lough of Belfast.

The main body of the stream, ebb and flood, crosses the entrance of this Lough in a curve from the Copeland Islands to Blackhead, and near the islands gains a strength of 5 knots; this curve bends more and more in until it stretches from Whitehead to Grey Point, when it divides, one part of the flood running up to Garmoyle, the other bending back and running towards Orlock, and near that place will carry a vessel upon the Briggs if not guarded against.

The first of the flood sets through the Copeland Sound and between the islands at a rapid rate, and care must be taken not to be swept into the intricate passage between the Copeland Islands. At half tide all the inshore part of the tide within  $1\frac{1}{2}$  miles of the coast south of the Copelands slacks, and shortly turns to the northward and runs for 3 hours, whilst the stream in the offing is still going to the southward; so that from Ballyferris Point to Foreland Point, quite close in, the stream runs 9 hours to the northward and only 3 to the southward.

Position.	Remarks on the Tides near the Land.	Magnetic Direction					
		From	5 Miles.	Rate.	Rate.	Rate.	Rate.
On a line joining Corsewall Point and Sanda Sound.	Near Corsewall the stream gains strength, and close in takes the curve of the land, the flood setting to the S.W. round the lighthouse, and the ebb vice versa.	Corsewall Point.	S. $\frac{1}{2}$ E. N.N.W.	$1\frac{1}{2}$ $1\frac{1}{2}$	S.E. $\frac{1}{2}$ S. N.W. $\frac{1}{2}$ N.	$1\frac{1}{2}$ $1\frac{1}{2}$	F E
On a line joining Muck Island and Corsewall Point.	Close to Muck Island the stream attains great strength, the flood turning round Blackhead into the Lough of Belfast, but at a few miles off shore it runs straight on for the Copeland Islands.	Muck Island.	S. by E. $\frac{1}{2}$ E. N.by W. $\frac{1}{2}$ W.	$1\frac{1}{2}$ $1\frac{1}{2}$	S. by E. $\frac{1}{2}$ E. N.by W. $\frac{1}{2}$ W.	$1\frac{1}{2}$ $1\frac{1}{2}$	F E

The tides off Muck Island run from  $3\frac{1}{2}$  to  $4\frac{1}{2}$  knots close in, and occasion a race and heavy breaking sea at the springs; and in blowing weather there are races also off both Blackhead and Whitehead, and also the Gobbins; with the *ebb-tide* there is an eddy from half tide, close in with the shore, which may be taken advantage of by steamers at all times, and by sailing-vessels with a leading wind; but it does not extend sufficiently far off for sailing-vessels to benefit by it with a working wind, as they would be in danger of getting on the rocks if they missed stays.

Position.	Remarks on the Tides near the Land.	Magnetic Direction of the Stream.					
		From	$\frac{1}{2}$ over.	Rate.	$\frac{1}{2}$ over.	Rate.	Rate.
On a line joining Tor Point and Mull of Cantyre.	Close off Tor Point the flood runs upwards of four knots at springs.	Tor Point	S. by E. N. by W.	4 $3\frac{1}{2}$	S. by E. $\frac{1}{2}$ E. N. by W. $\frac{1}{2}$ W.	4 $3\frac{1}{2}$	F E

**TIDAL STREAMS in the IRISH CHANNEL—continued.**

3rd quarter of the flood having turned to the northward, meets the tide the Sound off the Deputy Reef, and they jointly strike off for the south the Copeland Islands and pass over the Bushes, and thence through the between the Islands.

eddy under Mew Island at this time rushes with great speed to the until it meets the true tide, and with it forms a race which sailing-vessels avoid; upon the ebb a similar race occurs, but to the N. E. of Mew Island.

ast of the flood goes to the northward through the Sound, and splits off h end of the Copeland, and one part runs for Mew Island, throwing off s between the islands.

bout the Copeland Islands the eddies are very strong, and at night a ould be sure that she is outside the drift of the point of Mew Island.

cam.		From	Remarks on the Tides near the Land.	Position.
S Miles.				
S.E. by W.	Rate. 2 1 ½	Sanda Island	The tide runs fast past Sanda Island, and is variable in its direction. Off the western end of the island it splits; the outer part passing on for the Clyde, and the other going inside the island, and up Kilbrennen Sound, as mentioned below.	On a line joining Sanda Island and Corsewall Point.
½ E. ¾ W.	1 ¼ 1 ½	Corsewall Point.	- - - - -	On a line joining Corsewall Point and Muck Island.

r passing Whitehead, the tide slacks considerably as you enter the Lough. the flood there is a strong eddy under Muck Island, which will be found useful to steamers and even sailing-vessels beating along this coast; with a rly wind they will do well to keep close in with the shore hereabout, as the h of the flood strikes off from Muck Island in a S. E. direction, till it meets eam which passes the eastern side of the Maidens, when it takes a channel on; the meeting of these two tides appear to have occasioned a deep ditch, h will be found from 90 to 100 fathoms water.

Remarks on the Tides near the Land.	Position.
he Mull of Cantyre the stream runs 5 knots, and occasions a heavy erous sea in bad weather; with either tide, quite close in, there is an eddy. n the Mull of Cantyre the flood takes a direction nearly for Sanda id, and divides off its western end: one part passing inside the island up Kilbrennen Sound, the other running on for the Clyde.	On a line join- ing Mull of Cantyre and Tor Point.

## THE TIDES NEAR RATHLIN ISLAND.

BY RICHARD HOSKYN, STAFF COMMANDER R.N.,

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(Formerly in charge of the Survey on the North-east Coast of Ireland.)

- Rate of tide.* ABOUT Rathlin Island the tides are very rapid, in the Sound they run from 4 knots at neaps to  $6\frac{1}{4}$  knots at springs, occasioning strong eddies along the shores, with heavy overfalls off all the headlands.
- Eddy from Tor Point through the Sound.* On each side of Tor Point there is an eddy which at half tide gradually extends from the shore, at the last quarter of the Channel flood this eddy goes to the westward through Rathlin Sound, causing the ebb stream to make there  $1\frac{1}{2}$  hours sooner than it does to the northward of the island; by taking advantage of these eddies a ship from the southward may carry 9 hours tide with her through Rathlin Sound.
- Eddy on south shore.* To the westward of Fair Head all along the south shore of the Sound as far as Sheep Island there is an eddy with both streams, commencing at half tide. Carrickvaan Rock lies at the junction of the eddy and true streams.
- Ebb stream.* During the first hour and half, the ebb stream sets round the Rue Point into Church Bay, but after high water at Liverpool, when the general stream north of the island has made to the westward, and it has attained a rate of  $6\frac{1}{4}$  knots through the Sound, an eddy begins in Church Bay, setting from the Bull Point towards the Rue, and meeting the true tide about a mile to the westward of the latter, where the bottom is very irregular, a great overfall is occasioned, called Slough-na-more, which may be attended with danger to small vessels.
- Eddy in Church Bay.* The eddy from Church Bay has now forced the main stream into a more southerly course, with contracted limits it sets from Rue Point towards the Carrickvaan Rock, whence it shoots off in a N.W. direction towards the Bull Point at the west end of Rathlin, meeting there the stream from the north side of the island setting to the S.W.
- Dangerous overfall.* The flood or eastern stream does not begin in the middle of the Sound until it is low water at Liverpool, although, as before observed, the eddy along the south shore commences at half tide. There is no slack water preceding the flood stream; in the eastern part of the Sound at low water it sets south  $2\frac{1}{2}$  knots, in the western part at the same moment it sets north  $1\frac{3}{4}$  knots, eddying round at each station in opposite directions. The stream soon becomes general, setting fair through the Sound, and rushing out of Church Bay past the Rue with great force, including the eddy before alluded to, it sets for 10 hours across Church Bay to the eastward. During the flood stream there is an eddy to the eastward of the island, extending  $2\frac{1}{2}$  miles from the shore, setting back on the island; at the junction of the eddy and true streams there are great overfalls off Altacarry Head, and again off the Rue as mentioned above.
- Direction of ebb.* With a commanding breeze there is no danger in the navigation of Rathlin Sound, but in light winds great vigilance is necessary to avoid being caught in the eddies or overfalls.
- Flood stream.* Off Bengore Head, at a mile distant, the stream turns about 15 minutes after high and low water at Liverpool; springs run 9 knots, the ebb setting W.N.W. and the flood E. b. S. In the bays on each side of the heads an eddy begins when the stream in the offing has run half its course.
- Eddy to eastward of Island.*
- Navigation of Sound.*
- Streams off Bengore Head.*

At the Skerry Islets the *ebb stream* sets fair through the anchorage and Sound to the westward, attaining a velocity of 3 to  $3\frac{1}{2}$  knots in its passage between Ramore Head and the Carr Rocks, and creating a very troublesome sea.

*Streams near the Skerry Islet.*

The flood stream sets from Ramore Head towards the Carr Rocks; when the Sound is entered it sets fair through.

In Broad Sound it sets down on the Little Skerry, while the ebb inclines to the northward through the Sound.

At the anchorage under the Great Skerry there is little tide felt, on the flood it is slack water at half tide, on the ebb with the last quarter, while on the north side of the rocks the stream runs with a velocity of 3 knots.

As we proceed to the westward towards Lough Foyle the tide loses much of its strength, north of the mouth of the Bann, 3 miles off shore its average rate at springs is  $1\frac{1}{2}$  knots.

*To the westward.*

There is an eddy tide all the way along the shore from the Skerry Islets to the mouth of the Bann, commencing at half tide, the line of its junction with the main stream being marked by a strong rippling.

*Eddy.*

Two miles north of Port Stewart the channel stream turns to the eastward 1 hour and 40 minutes after low water at Liverpool, or at high water on the adjoining shore, and to the westward 31 minutes after high water at Liverpool, or three quarters of an hour before low water on the adjoining shore, so that, on this part of the coast, the tide wave (with reference to its head at Liverpool) being nearly reversed, we witness (what to a person watching the rise and fall of the tide on the shore appears at first sight so anomalous) the whole of the ebb stream coming from the ocean, while the flood comes from the opposite quarter.

*Off Port Stewart.*

*High and low water not occasioned by tidal stream,*

Referring the tidal stream to the head of the tide at Liverpool, and the varying times of high water to the undulation of the tide wave, this apparent anomaly disappears.

*but by tidal wave.*

All this coast to the westward of Fair Head is subject to a ground swell, in fine weather the commencement of the east-going stream is made apparent by the sudden appearance of the swell, resuming again a comparative state of quiet when the west-going stream makes.

*Ground swell.*

## SECTION II.

## THE TIDAL STREAMS OF THE ENGLISH CHANNEL, WITH TABLES SHOWING THEIR COURSE AND RATE AT EVERY HOUR OF THE TIDE AT DOVER.

*Streams turn with the tides of Dover.*

IN the English Channel, as before stated (page 120), the time of high water at *Dover* is to be taken as the standard, so that whenever either the time of the turn or the direction of the stream is required to be known, the time of the ship is to be compared with the time of high water for the day at the standard place, and the interval sought in the table which accompanies these remarks, and in the column answering to the ship's position will be found the information required.\*

*Tidal Compartments.*

In these tables it has been necessary to class the information under heads answering to the various compartments of the Channels, for the courses of the stream in the mixed tides are so changeable that a very different stream will be found running at a place but little removed from another in the same portion of the Channel. The seaman must therefore look in which compartment according to his latitude and longitude his ship is sailing, and in which quarter of that compartment, whether N.E., N.W., S.E., or S.W., and then enter the table for the direction of the stream.

*1st Compartment.*

The 1st compartment, as previously stated (page 120), comprises the approach to the English Channel *westward of a line joining Ushant and Scilly.*

*2d Compartment.*

The 2d compartment comprises a space eastward of the before-mentioned line from Ushant to Scilly, and as far as a *line joining the Start and the Casquets.* In this part of the Channel there is a mixed tide, partaking of the joint directions of the Channel and Offing streams.

*3d Compartment.*

The 3d compartment is bounded on the west by the line joining the Casquets and the Start, and on the east by a line from *Beachy Head to Dieppe*, having the Baie de la Seine on the south. As soon as a vessel passes to the eastward of the Start and Casquets she gets into the true Channel stream which sets straight up and down Channel in the fairway, and will always carry a vessel *towards Beachy Head* while the water is *rising at Dover*, and *from it* while it is *falling there.*

*4th Compartment.*

The 4th compartment comprises the Gulf of St. Malo, an estuary which from its magnitude and large tides exercises a powerful influence over the navigation of that part of the Channel in its immediate vicinity; and the seaman must be especially on his guard when drawing near this locality. With the *falling water* at Dover the stream sets sharply *into this Gulf* on both sides,† which the prevalence of westerly winds is said to increase, and with the *rising water* at Dover it sets *across and out of* the Gulf, the north-eastern part of the stream sweeping round the Casquets towards Alderney, and through the Russel and other Channels about Guernsey towards the race of Alderney.

*5th Compartment.*

The 5th compartment contains the great bight on the south side of the Channel eastward of Cape Barfleur, known as the Baie de la Seine. With the *rising water* at Dover the stream sets sharply round Cape Barfleur *into the bay*, curving more and more as the depth of the bay is gained until it finally takes the sweep of the shore. With the flood tide the western half of the bay is partly in eddy, and the tide slackens in all that part nearly an hour before high water at Dover, whilst in the eastern half of the bay it runs about half an hour longer than at Dover.

\* The time at ship is to be corrected for the longitude of Dover.

† A return of the vessels wrecked on the Channel Islands shows that the greater part of them came ashore about the end of the falling water at Dover.

so that here a ship beating up Channel towards the end of a rising tide at Dover may prolong the tide in her favour by standing close over to the French Coast eastward of Havre. On approaching Boulogne, however, at the beginning of a *rising tide*, great attention should be paid to the direction in the tables, as the streams hereabout meet and are turned down upon the French Coast, so that a ship, which on the English side would at this time have a stream setting straight up Channel, here encounters one upon her beam, sweeping her down towards the Somme, and hence probably the cause of some of the many disastrous losses which have occurred in this part of the Channel.

6th Compartment.

The 6th compartment is between Beachy Head and the North Foreland, and the Somme and Dunkerque. In this space the streams from the Channel and North Sea *meet* while the water is *rising* at Dover, and *separate* while it is *falling* there. The point of union and separation is not, however, stationary, but moves from west to east both on the rising and falling water. For instance, an hour after high water at Dover the separation begins off Beachy Head; in two hours it has reached Hastings, in three hours Rye, and so it creeps on until at low water it has gained the line extending from the North Foreland to Dunkerque. At this time the offing streams on both sides have done, and it is slack water all over the North Sea and English Channel as far as the true tide extends; but the stream does not at this time cease in the intermediate tide. When the water at Dover begins to rise, the stream on either side sets *towards Dover*, and that from the North Sea consequently *goes with the intermediate* tide, which had not yet ceased running to the westward, while the other, the Channel stream, *opposes* it, and this opposition continues throughout the rising tide at Dover; the point of meeting gradually shifting its position eastward as the tide advances on the shore.\* About the time when the water at Dover has done rising, the line of meeting has reached the North Foreland, and the streams are now slack over the Channels east and west, leaving the intermediate stream running alone as before to the eastward. The next hour finds the offing streams made down east and west, so that now the intermediate stream falls in with the North Sea stream and goes with it, whilst on the west it separates from the Channel stream, splitting at the same point, Beachy Head, as at first.

Such is the general description of the course and routine of the tidal streams of the English Channel and intermediate tide, a careful perusal of which will enable the reader the more readily to understand the directions and tables annexed.

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\* The place of *meeting* begins off Beachy Head at *five hours before* high water on the same spot as that of the *separation* at *one hour after* high water; the place of *four hours before* high water is nearly the same as that of the separation at *two hours after*; and so on nearly with the subsequent hours.



## TIDAL STREAMS

TABLE showing the MAGNETIC DIRECTION of the STREAM in the ENGLISH CHANNEL at every HOUR of the TIDE at DOVER.

## COMPARTMENT I.

Westward of a Line joining Ushant and the Land's End.

Hours.	North Side of Latitude 49°00' N.						REMARKS.	South Side of 49°00' N.	
	West part.	Rate.	Near Scilly.	Rate.	Seven Stones.	Rate.		West part.	Rate.
After High Water, Dover.	1 W.N.W. $\frac{1}{4}$ W.	Greatest rate, springs, 1°50 knots.	N.N.W. $\frac{1}{4}$ W.	Greatest rate, springs, 1°50 knots.	N. $\frac{1}{4}$ W.	Greatest rate, springs, 1°50 knots.		W. $\frac{1}{4}$ S.	Greatest rate, springs, 1°50 knots.
	2 N. $\frac{1}{2}$ W.		N. $\frac{1}{4}$ W.		N.N.E.			N. by W. $\frac{1}{4}$ W.	
	3 N.E. $\frac{1}{4}$ E.		N.N.E.		N.E. $\frac{1}{4}$ N.			E.N.E. $\frac{1}{4}$ E.	
	4 E.N.E. $\frac{1}{4}$ E.		N.N.E.		N.E. $\frac{1}{2}$ E.			E.N.E. $\frac{1}{4}$ E.	
	5 E.N.E. $\frac{1}{4}$ E.		N.E. by E.		N.E. $\frac{1}{4}$ E.			N.E. by E. $\frac{1}{4}$ E.	
	6 E. $\frac{1}{4}$ S.		E. $\frac{1}{4}$ S.		E.N.E. $\frac{1}{4}$ E.			Turning.	
Before High Water, Dover.	1 S.E. by E. $\frac{1}{4}$ E.	Greatest rate, springs, 1°50 knots.	-	Greatest rate, springs, 1°50 knots.	S. $\frac{1}{4}$ W.	Greatest rate, springs, 1°50 knots.		S. by E. $\frac{1}{4}$ E.	Greatest rate, springs, 1°50 knots.
	2 S. $\frac{1}{2}$ E.		South.		S.S.W. $\frac{1}{4}$ W.			Draining.	
	3 S.S.W. $\frac{1}{4}$ W.		S.W.		S.S.W. $\frac{1}{4}$ W.			S.W. $\frac{1}{4}$ W.	
	4 S.W. by W.		S.W. by W.		S.W. $\frac{1}{4}$ S.			S.W. $\frac{1}{4}$ S.	
	5 S.W. by W.		S.W. by W.		S.W. $\frac{1}{4}$ S.			S.W. by W. $\frac{1}{4}$ W.	
	6 W.S.W. $\frac{1}{4}$ W.		S.W. by W.		W.S.W.				

## COMPARTMENT II.

Between { A Line joining the Land's End and Ushant,  
" " the Casquets and Start, and  
" " the Casquets and Sept Iles.

Hours.	North Side of the Channel.					REMARKS.	South Side of the Channel.				
	West part.	Rate.	Centre.	Rate.	East part.		West part.	Rate.	Centre.	Rate.	East part.
After High Water, Dover.	1 W.N.W. $\frac{1}{4}$ W.	Greatest rate, springs, 2°00 knots.	W. $\frac{1}{4}$ N.	Greatest rate, springs, 2°35 knots.	W. $\frac{1}{4}$ N.	{ W. $\frac{1}{4}$ S. near Hurd's Deep. }	W. $\frac{1}{2}$ S.	Greatest rate, springs, 1°50 knots.	W. $\frac{1}{4}$ N.	Greatest rate, springs, 1°50 knots.	W. $\frac{1}{4}$ S.
	2 Turning.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ N.		Slack.		West.		W. by S.
	3 N. $\frac{1}{4}$ E.		W. $\frac{1}{4}$ N.		West.		East.		Slack.		W.S.W.
	4 E. $\frac{1}{2}$ S.		Slack.		S. $\frac{1}{2}$ W.		E. by N.		E.S.E. $\frac{1}{4}$ E.		S.E. by S.
	5 East.		E. $\frac{1}{4}$ S.		S.E. $\frac{1}{4}$ S.		E.N.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.		S.E. by E. $\frac{1}{4}$ E.
	6 E. by S.		E. $\frac{1}{4}$ S.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		S.E. by E. $\frac{1}{4}$ E.		S.E. $\frac{1}{4}$ S.
Before High Water, Dover.	1 E.S.E. $\frac{1}{4}$ E.	Greatest rate, springs, 2°00 knots.	E. by S.	Greatest rate, springs, 2°35 knots.	E. by S.		E. $\frac{1}{4}$ S.	Greatest rate, springs, 1°50 knots.	E. by S.	Greatest rate, springs, 1°50 knots.	E.S.E. $\frac{1}{4}$ E.
	2 Slack.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.		N.E. by E. $\frac{1}{4}$ E.		Slack.		E. $\frac{1}{4}$ N.
	3 Turning.		Slack.		E. $\frac{1}{4}$ S.		Slack.		W.N.W.		North.
	4 W. by N.		W. $\frac{1}{4}$ N.		Turning.		Slack.		Slack.		W.N.W. $\frac{1}{4}$ W.
	5 W. $\frac{1}{4}$ S.		W. $\frac{1}{4}$ N.		W.S.W. $\frac{1}{4}$ W.		S.W. by W.		W. by N.		N.W. $\frac{1}{4}$ W.
	6 W. $\frac{1}{4}$ S.		W. $\frac{1}{4}$ N.		W.S.W. $\frac{1}{4}$ W.						

## COMPARTMENT III.

Between { A Line joining Start and Casquets, and  
" " Point Ailly and Beachy Head.

Hours.	West part.	Rate.	Centre.	Rate.	East part.	Rate.	REMARKS.	Over Hurd's Deep.	Rate.	Off Cape Bardeur.	Rate.
After High Water, Dover.	1 W. $\frac{1}{4}$ N.	Greatest rate, flood 2°30 knots, ebb 2°40	W.N.W. $\frac{1}{4}$ W.	Greatest rate, flood 3°6 knots, ebb 3°3	Turning.	Greatest rate, flood 3°00 knots, ebb 2°40		W. $\frac{1}{4}$ S.	Greatest rate, flood 2°15 knots, ebb 2°40	N.W.	Greatest rate, flood 2°4 knots, ebb 2°5
	2 W.N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{2}$ W.			W. $\frac{1}{2}$ S.		N.W.	
	3 W. $\frac{1}{4}$ N.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.			W. $\frac{1}{2}$ S.		N.W.	
	4 W. $\frac{1}{4}$ S.		W.N.W.		W. $\frac{1}{4}$ N.			W.S.W.		N.W.	
	5 W. $\frac{1}{4}$ S.		W.N.W.		W. by N.			W.S.W. $\frac{1}{4}$ W.		N.W.	
	6 N.N.E. $\frac{1}{4}$ E.		W.N.W. $\frac{1}{4}$ W.		W. by N.			Slack.		N.W.	
Before High Water, Dover.	1 E. $\frac{1}{4}$ S.	Greatest rate, ebb 1°5 - -	E.S.E.	Greatest rate, ebb 2°5 - -	E.S.E. $\frac{1}{4}$ E.	Greatest rate, ebb 2°5 - -		E. $\frac{1}{2}$ S.	Greatest rate, ebb 2°5 - -	S.E.	Greatest rate, ebb 2°5 - -
	2 E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.			E. $\frac{1}{4}$ S.		S.E.	
	3 E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.			E. $\frac{1}{4}$ S.		S.E.	
	4 E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.			E. $\frac{1}{2}$ N.		S.E.	
	5 E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.			E.N.E.		S.E.	
	6 E.S.E. $\frac{1}{4}$ E.		E.S.E.		E. $\frac{1}{4}$ S.						

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trance of Gulf of St. Malo on a line joining Brehat Island and S.W. line of Guernsey Island.

12 miles from Brehat Island.		12 miles from Guernsey Island.		REMARKS.	Near S.W. Point, Guernsey Island.		4 miles W. by S. from Casquets.		4 miles W.N.W. of Cape La Hague.	
Course.	Rate.	Course.	Rate.		Course.	Rate.	Course.	Rate.	Course.	Rate.
N.W. by W.	Greatest rate, springs, uncertain knots.	W. $\frac{3}{4}$ N.	Greatest rate, springs, uncertain knots.		W. $\frac{3}{4}$ N.	Greatest rate, springs, uncertain knots.	W. $\frac{3}{4}$ S.	Greatest rate, springs, uncertain knots.	S.W. by W. $\frac{3}{4}$ W.	Greatest rate, springs, 5 to 7 knots.
S. $\frac{1}{2}$ W.		S. $\frac{3}{4}$ W.			S.S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ W.		S.W. by W. $\frac{3}{4}$ W.	
S. $\frac{3}{4}$ W.		S. $\frac{3}{4}$ W.			S.S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ W.		S.W. by W. $\frac{3}{4}$ W.	
S.E. $\frac{1}{4}$ S.		S.S.E. $\frac{3}{4}$ E.			S.E. by E. $\frac{1}{2}$ E.		S. by E. $\frac{1}{4}$ E.		S.W. $\frac{1}{4}$ S.	
S.E. $\frac{1}{4}$ S.		S.E. $\frac{3}{4}$ E.			S.E. by E. $\frac{1}{2}$ E.		S.E. $\frac{1}{2}$ E.		S.W. $\frac{1}{4}$ S.	
S.E. $\frac{1}{2}$ S.		S.E. $\frac{1}{4}$ S.			S.E. by E. $\frac{1}{2}$ E.		S.E. $\frac{1}{2}$ E.		N.E. by E. $\frac{3}{4}$ E.	
S.E. $\frac{1}{4}$ E.		S.E. by E.			{ S.E. by E. $\frac{1}{2}$ E. }		E. $\frac{3}{4}$ N.		N.E. by E. $\frac{3}{4}$ E.	
..		..			{ E. $\frac{1}{4}$ N. }		N.E. $\frac{1}{2}$ N.		N.E. by E. $\frac{3}{4}$ E.	
N.W. by W.		N.W. $\frac{1}{4}$ N.			{ S.E. by E. $\frac{1}{2}$ E. }		N.E. $\frac{1}{2}$ N.		N.E. $\frac{1}{4}$ N.	
N.W. by W.		N.W. $\frac{1}{4}$ W.			{ E. $\frac{1}{2}$ N. }		N.E. by E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ N.	
N.W. $\frac{3}{4}$ W.		W.N.W. $\frac{1}{4}$ W.			E. $\frac{1}{4}$ N.		N.W. $\frac{1}{2}$ W.		N.E. $\frac{1}{4}$ N.	

**In the Baie de la Seine, south of a line joining Cape Barfleur and Cape Antifer.**

Hours.	West Part.	Rate.	Centre.	Rate.	East Part.	Rate.	REMARKS.
After High Water.	1 N.N.W. $\frac{3}{4}$ W.	} knots. 4:20 3:50	N.W. by W. $\frac{3}{4}$ W.	} knots. 3:20 3:20	W. $\frac{3}{4}$ N.	} knots. 3:30 3:00	
2	N.N.W. $\frac{1}{2}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		
3	N.N. W.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{3}{4}$ W.		
4	N.N.W. $\frac{3}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ N.		
5	N. by W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ N.		
6	Slack.		N.W. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		
Before High Water.	5 S.S.E.	} Greatest rate, - } springs.	S.E. by E. $\frac{1}{4}$ E.	} Greatest rate, - } springs.	W. $\frac{1}{4}$ S.	} Greatest rate, - } springs.	
4	S.S.E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
3	S.S.E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{2}$ E.		
2	S.E. by S.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		
1	S.E. by S.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{2}$ E.		

Between { A line joining Beachy Head and Point Ailly, and  
          "       the North Foreland and Dunkerque.

REMARKS.	West of	East of	Off Southsand Head.	Off Northsand Head.
	Line of Separation.		Course.	Course.
{ The Tides separate on a line joining— Beachy Head and St. Valery . . . . .	W. by N.	N.E. by E. $\frac{1}{4}$ E.	N.E. $\frac{1}{4}$ E.	N.N.E.
Hastings and Treport . . . . .	W. $\frac{1}{4}$ N.	N.E. by E. $\frac{1}{4}$ E.	N.E. $\frac{3}{4}$ E.	N.N.E.
Hastings and Cayeux . . . . .	W. $\frac{1}{4}$ N.	N.E.	N.E. by E. $\frac{1}{4}$ E.	N.E. $\frac{1}{4}$ E.
Folkstone and Calais . . . . .	W. by S.	E.N.E.	N.E. by E. $\frac{1}{4}$ E.	E. by S.
South Foreland and Point Gravelines . .	s.w. by w. $\frac{1}{4}$ w.	N.E. by E. $\frac{1}{4}$ E.		
{ Ramsgate and Nieuport, passing over North Sand Head, the South Line of the Falls, and the banks off Nieuport . . . . .	W. by S.	{ E. $\frac{1}{4}$ N. and Northward.	{ S.W. $\frac{1}{4}$ S.	S.S.W.
{ The Tides meet on a line joining— Beachy Head and Point Ailly . . . . .	E.S.E.	s.w. by w. $\frac{1}{4}$ w.	S.W.	S.S.W.
{ Bexhill and Cayeux, both streams turning down towards the "Somme" . . . . .	S.S.E. $\frac{1}{4}$ E.	S. by W. $\frac{1}{4}$ W.	S.W. $\frac{3}{4}$ W.	S.S.W.
{ The Tides meet on a line joining Rye and the Somme, passing over the Bassuville, both tides setting to the Somme . . . . .	S.E. by E. $\frac{1}{4}$ E.	S.W. by W.	W.S.W. $\frac{1}{4}$ W.	S.S.W.
{ The Tides meet on a line joining— Dungeness and Touquet Point . . . . .	E. by N.	W.S.W. $\frac{1}{4}$ W.	W. $\frac{3}{4}$ N.	S.S.W.
Do. Dover and Dunkerque nearly . . . . .	N.E. by E. $\frac{1}{4}$ E.	W.S.W.	N.N.E.	S.S.W.

## SECTION III.

## TIDAL STREAMS IN THE NORTH SEA.

*Streams turn  
with the Tides  
of Dover.*

IN the North Sea the general features of the streams correspond exactly with those of the English Channel, but the *direction* of the stream is reversed. As soon as the intermediate tide is passed, on coming from the westward, a ship enters the True Stream, which extends from the North Foreland to a line joining the Leman and Ower Light and the Texel. To the northward between the Ower and Texel a mixed tide occurs, similar to that which is experienced off the Start, occasioned by the channel stream encountering that of the Offing Stream; and beyond these limits the time of slack water varies with the advance of the tidal hour, as at the entrance of the English Channel; and with this peculiarity also, that in a very short distance there occurs a difference of three hours in the time of slack water.

*Direction of  
• True Stream.*

The True Stream will always carry a vessel *towards* the North Foreland while the water is *rising at Dover*, and *from it* while it is *falling at that place*.\* This stream sets nearly N.E. and S.W., except near the coasts, where it partakes of the form of the land; and at the entrance of the Thames where it is diverted from its course by the river. The annexed table will show these deviations and the exact course of the stream in the channel, which, for the convenience of reference, is also divided into compartments.

*North Sea  
divided into 15  
Compartments.*

The 7th compartment comprises the entrance to the Thames; viz., at the Mouse, Sunk, Kentish Knock, and Galloper Light Vessels, and 5 miles north of the North Foreland.

The 8th compartment comprises a space between the mouth of the Thames and the coast of the Netherlands south of  $52^{\circ}$  N.

The 9th compartment comprises between  $52^{\circ}$  and  $53^{\circ}$  N. and the English coast as far as  $2^{\circ}$  E. and also the Shipwash, Stanford, Saint Nicholas Gat, Cockle, Newarp, and Hasborough Light Vessels.

The 10th compartment comprises between  $52^{\circ}$  and  $53^{\circ}$  N. and from  $2^{\circ}$  to  $3^{\circ}$  E.

The 11th compartment comprises between  $52^{\circ}$  and  $53^{\circ}$  N., and from  $3^{\circ}$  to  $4^{\circ}$  E.

The 12th compartment comprises between  $52^{\circ}$  and  $53^{\circ}$  N., and from  $4^{\circ}$  E. to the coast of the Netherlands.

The 13th compartment comprises between  $53^{\circ}$  and  $54^{\circ}$  N., and from  $1^{\circ}$  to  $3^{\circ}$  E., and the Leman and Ower Light Vessel.

The 14th compartment comprises between  $53^{\circ}$  and  $54^{\circ}$  N., and from  $3^{\circ}$  to  $5^{\circ}$  E.

The 15th compartment comprises between  $53^{\circ}$  and  $54^{\circ}$  N. and westward of  $1^{\circ}$  E., and the Spurn and Dudgeon Light Vessels.

The 16th compartment comprises from  $1^{\circ}$  to  $8^{\circ}$  E. on the parallel of  $54^{\circ}$  N.

The 17th compartment comprises from  $0^{\circ}$  to  $8^{\circ}$  E. on the parallel of  $55^{\circ}$  N.

The 18th compartment comprises from  $1^{\circ}$  to  $8^{\circ}$  E. on the parallel of  $56^{\circ}$  N.

The 19th compartment comprises from  $2^{\circ}$  W. to  $8^{\circ}$  E. on the parallel of  $57^{\circ}$  N.

The 20th compartment comprises from  $3^{\circ}$  W. to  $3^{\circ}$  E. on the parallel of  $58^{\circ}$  N.

The 21st compartment comprises from  $2^{\circ}$  W. to  $0^{\circ}$  on the parallel of  $59^{\circ}$  N.

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\* Upon the banks lying towards the coast of Holland, between the Texel and the Schelde, where there is scarcely any rise or fall of the water, the stream continues nearly 40 minutes longer than in other parts of the channel.

TABLE showing the MAGNETIC DIRECTION of the TIDAL STREAMS in the NORTH SEA from a line joining the SPURN POINT and HELGOLAND to the NORTH FORELAND at every hour of the tide at DOVER.

## COMPARTMENT VII.

Entrance to the Thames.

Hours.	Mouse Light Ship.		Sunk Light Ship.		Kentish Knock Light Ship.		4 Miles north of North Foreland.		Galloper Light Vessel.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 W. by N.	Greatest rate, springs, 2 50 knots.	Slack.	Greatest rate, springs, 3 00 knots.	N.E.	Greatest rate, springs, 2 80 knots.	N.N.W. ¼ W.	1 80	N.E. ¼ E.	Greatest rate, springs, 2 5 knots.
	2 Slack.		N.E. by E. ¾ E.		N.E.		N. ¼ E.	1 20	N.E. by E.	
	3 E. ¾ S.		E.N.E. ¾ E.		N.E.		N.E. ½ E.	1 18	N.E. by E.	
	4 E. ¼ S.		E.N.E. ¾ E.		N.E.		E.S.E. ¾ E.	1 46	N.E. ¾ E.	
	5 E. ¼ S.		E.N.E. ¾ E.		N.E.		E.S.E. ¾ E.	1 60	N.E. by E.	
	6 E. ¼ S.		E.N.E. ¾ E.		N.E.		S.E. ¼ E.	1 45	N.E. by E.	
Before High Water, Dover.	5 E. ¾ S.	Greatest rate, springs, 2 50 knots.	..	Greatest rate, springs, 3 00 knots.	S.W. ¼ S.	Greatest rate, springs, 2 80 knots.	S.S.E. ½ E.	1 30	S. ¾ W.	Greatest rate, springs, 2 5 knots.
	4 Slack.		S.W. by W. ¾ W.		S.W. ¼ S.		S. ¾ W.	1 36	S.W. ¼ S.	
	3 W. ¼ S.		S.W. by W. ¾ W.		S.W. ¼ S.		S.W. ½ S.	1 60	S.W. by W.	
	2 W. ¼ S.		W.S.W. ¾ W.		S.W. ¼ S.		S.W. ½ W.	1 65	S.W. by W. ¼ W.	
	1 W. ¼ S.		W. ¼ S.		S.W. ¼ S.		W.S.W.	1 40	W.S.W.	

## COMPARTMENT VIII.

Between the mouth of the Thames and the coast of the Netherlands south of 52° N. latitude.

Hours.	West of 2° E.		Between 2° and 3° E.		East of 3° E.		REMARKS.
	Course.	Rate.	Course.	Rate.	Course.	Rate.	
After High Water, Dover.	1 N.E. ¼ E.	Greatest rate, springs, 2 50 knots.	E.N.E. ¼ E.	Greatest rate, springs, 2 50 knots.	N.E. by E. ¾ E.	Greatest rate, springs, 2 50 knots.	Stream from the Schelde N.W. by W. to 3° E. turning sharply to N.E. Stream from the Schelde N.W. by W. to 2 30 E. turning sharply to N.N.E. ½ E.
	2 N.E. ½ E.		E.N.E.		N.E. by E.		
	3 N.E.		N.E.		N.E. ¼ E.		
	4 N.E. by E. ¼ E.		N.E. ¼ E.		N.E. ½ E.		
	5 N.E. ½ E.		N.E. ½ E.		N.E. ¼ E.		
	6 N.E. ¼ E.		N.E.		N.N.E. ¼ E.		
Before High Water, Dover.	5 S.W. ¼ S.	Greatest rate, springs, 2 50 knots.	S.W. by W. ¾ W.	Greatest rate, springs, 2 50 knots.	W.S.W.	Greatest rate, springs, 2 50 knots.	
	4 S.W.		S.W. ½ W.		S.W. ¾ W.		
	3 S.W.		S.W.		S.W. ¾ W.		
	2 S.W.		S.W.		S.W. ½ W.		
	1 S.W. ¼ S.		S.W.		S.W. ¼ W.		

## COMPARTMENT IX.

Between the latitude 52° and 53° N. and the English Coast as far as 2° E. longitude.

Hours.	REMARKS.	
After High Water, Dover.	Stream runs northward.	
1		
2		
3		
4		
5		
Before High Water, Dover.	Taking the direction of the land, except close to the banks, for which special instructions are necessary.	
5		
4		
3		
2		
1		

## TIDAL STREAMS

COMPARTMENT IX.—*continued.*

Hours.	Shipwash Light Vessel.		Stanford Light Vessel.		St. Nicholas Gat Light Vessel.		Cockle Light Vessel.		Newarp Light Vessel.		Hasborough Li Vessel.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 E.N.E. $\frac{1}{4}$ E.		1 N.E. $\frac{1}{4}$ N.		1 N. $\frac{1}{4}$ E.		1 N.N.E.		1 N. $\frac{1}{4}$ W.		1 N. by W. $\frac{1}{4}$ W.	
	2 E.N.E. $\frac{1}{4}$ E.		2 N.E. $\frac{1}{4}$ N.		2 N. $\frac{1}{4}$ E.		2 N.N.E.		2 N. $\frac{1}{4}$ W.		2 N. by W. $\frac{1}{4}$ W.	
	3 E.N.E. $\frac{1}{4}$ E.		3 N.E. $\frac{1}{4}$ N.		3 N. $\frac{1}{4}$ E.		3 N.N.E.		3 N. $\frac{1}{4}$ W.		3 N. by W. $\frac{1}{4}$ W.	
	4 E.N.E. $\frac{1}{4}$ E.		4 N.E. $\frac{1}{4}$ N.		4 N. $\frac{1}{4}$ W.		4 N.N.E.		4 N. $\frac{1}{4}$ W.		4 N. by W. $\frac{1}{4}$ W.	
	5 N.E. by E. $\frac{1}{4}$ E.		5 N.E. $\frac{1}{4}$ E.		5 N. $\frac{1}{4}$ W.		5 N.N.E.		5 N. $\frac{1}{4}$ W.		5 N. by W. $\frac{1}{4}$ W.	
	6 N.E.		6 Slack		6 N. by W.		6 S. $\frac{1}{4}$ W. on the turn.		6 N. $\frac{1}{4}$ E.		6 S. by E.	
Before Low Water, Dover.	1 S.W. $\frac{1}{4}$ W.		1 S.W. $\frac{1}{4}$ S.		1 S. $\frac{1}{4}$ E.		1 S. $\frac{1}{4}$ W.		1 S. $\frac{1}{4}$ E.		1 S. by E. $\frac{1}{4}$ E.	
	2 S.W. by W. $\frac{1}{4}$ W.		2 S.W. $\frac{1}{4}$ S.		2 S. $\frac{1}{4}$ E.		2 S. $\frac{1}{4}$ W.		2 S. $\frac{1}{4}$ E.		2 S. by E. $\frac{1}{4}$ E.	
	3 S.W. by W. $\frac{1}{4}$ W.		3 S.W. $\frac{1}{4}$ S.		3 S. $\frac{1}{4}$ W.		3 S. $\frac{1}{4}$ W.		3 S. $\frac{1}{4}$ E.		3 S. by E. $\frac{1}{4}$ E.	
	4 S.W. by W. $\frac{1}{4}$ W.		4 S.W. by S.		4 S. $\frac{1}{4}$ W.		4 S. $\frac{1}{4}$ W.		4 S. $\frac{1}{4}$ E.		4 S.S.E.	
	5 S.W. by W. $\frac{1}{4}$ W.		5 S.S.W. $\frac{1}{4}$ W.		5 S. by W. $\frac{1}{4}$ W.		5 S. $\frac{1}{4}$ W.		5 S. $\frac{1}{4}$ E.		5 S. by E.	
	6 S.W. by W. $\frac{1}{4}$ W.						6 S. $\frac{1}{4}$ W.		6 S. $\frac{1}{4}$ E.			

## COMPARTMENT X.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and longitude  $2^{\circ}$  to  $3^{\circ}$  E.

Hours.	S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	Rate.	N.W. Quarter.	Rate.	REMARKS.
After High Water, Dover.	1 N.E. $\frac{1}{4}$ N.		1 N.E.		1 N.E. $\frac{1}{4}$ N. *		1 N. by W.		* Turning sharply off for the Leman and Ower.
	2 N.E. $\frac{1}{4}$ N.		2 N.E. $\frac{1}{4}$ N.		2 N.E. $\frac{1}{4}$ N.		2 N. $\frac{1}{4}$ E.		
	3 N.E. $\frac{1}{4}$ N.		3 N.E. $\frac{1}{4}$ E.		3 N.N.E. $\frac{1}{4}$ E.		3 N.N.E. $\frac{1}{4}$ E.		
	4 N.E.		4 N.E. $\frac{1}{4}$ N.		4 N.E. $\frac{1}{4}$ E.		4 N. $\frac{1}{4}$ W.		
	5 N.E. $\frac{1}{4}$ N.		5 N.E. $\frac{1}{4}$ N.		5 N.E. $\frac{1}{4}$ N.		5 N. $\frac{1}{4}$ W.		
	6 N.E. $\frac{1}{4}$ N.		6 N.E. $\frac{1}{4}$ N.		6 N.E. by N.		6 N.N.E. $\frac{1}{4}$ E.		
Before High Water, Dover.	1 S.W. $\frac{1}{4}$ S.		1 S.W. $\frac{1}{4}$ W.		1 S. $\frac{1}{4}$ E.		1 S. $\frac{1}{4}$ W.		* Turning sharply off for the Leman and Ower.
	2 S.W.		2 S.W. $\frac{1}{4}$ S.		2 South.		2 S. $\frac{1}{4}$ W.		
	3 S.W. $\frac{1}{4}$ S.		3 S.W. $\frac{1}{4}$ S.		3 S. by W. $\frac{1}{4}$ W.		3 S. by W.		
	4 S.W.		4 S.W. $\frac{1}{4}$ S.		4 S.S.W. $\frac{1}{4}$ W.		4 S.S.W.		
	5 S.W. $\frac{1}{4}$ W.		5 S.W. $\frac{1}{4}$ S.		5 S.W. $\frac{1}{4}$ S.		5 S. by W. $\frac{1}{4}$ W.		

## COMPARTMENT XI.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and longitude  $3^{\circ}$  to  $4^{\circ}$  E.

Hours.	S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	Rate.	N.W. Quarter.	Rate.	REMARKS.
After High Water, Dover.	1 N.E.		1 Slack.		1 N.E. $\frac{1}{4}$ N.		1 N.E. $\frac{1}{4}$ N.		Stream setting round Texel south-westerly.
	2 N.E.		2 N.E.		2 N.E.		2 N.E. $\frac{1}{4}$ N.		
	3 N.E.		3 N.E.		3 N.E.		3 N.E.		
	4 N.E. $\frac{1}{4}$ N.		4 N.E.		4 N.E. $\frac{1}{4}$ E.		4 N.E.		
	5 N.E. $\frac{1}{4}$ N.		5 N.E. $\frac{1}{4}$ N.		5 N.E. $\frac{1}{4}$ N.		5 N.E. $\frac{1}{4}$ N.		
	6 N.E. $\frac{1}{4}$ N.		6 N.E. $\frac{1}{4}$ N.		6 N.E. $\frac{1}{4}$ N.		6 N.E. $\frac{1}{4}$ N.		
Before High Water, Dover.	1 S.W. $\frac{1}{4}$ S.		1 S.W. $\frac{1}{4}$ S.		1 S. by E. $\frac{1}{4}$ E.		1 S.S.E. $\frac{1}{4}$ E.		Stream setting round Texel south-westerly.
	2 S.W. $\frac{1}{4}$ S.		2 S.W. $\frac{1}{4}$ S.		2 S.S.W.		2 South.		
	3 S.W. $\frac{1}{4}$ S.		3 S.W. $\frac{1}{4}$ W.		3 S.W. $\frac{1}{4}$ S.		3 S.W. $\frac{1}{4}$ S.		
	4 S.W. $\frac{1}{4}$ S.		4 S.W. $\frac{1}{4}$ W.		4 S.W. $\frac{1}{4}$ S.		4 S.W. $\frac{1}{4}$ S.		
	5 S.W. $\frac{1}{4}$ S.		5 S.W. $\frac{1}{4}$ W.		5 S.W. $\frac{1}{4}$ S.		5 S.W. $\frac{1}{4}$ S.		
	6 S.W. $\frac{1}{4}$ S.		6 S.W. $\frac{1}{4}$ W.		6 S.W. $\frac{1}{4}$ S.		6 S.W. $\frac{1}{4}$ S.		

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## COMPARTMENT XII.

Between the latitude  $52^{\circ}$  and  $53^{\circ}$  N. and from longitude  $4^{\circ}$  E. to the Coast of the Netherlands.

Hours.		REMARKS.
After High Water, Dover.	Stream runs northward.	The stream takes the direction of the land, except close to the banks, for which special instructions are necessary.
1		
2		
3		
4		
5		
6		
Before High Water, Dover.	Stream runs southward.	
5		
4		
3		
2		
1		

## COMPARTMENT XIII.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and from longitude  $1^{\circ}$  to  $3^{\circ}$  E.

S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	N.W. Quarter.	Leman and Ower Light Vessel.	REMARKS.
						Course. Rate.	
N.N.W. $\frac{1}{4}$ W.	Greatest rate, springs, {flood $2\frac{1}{2}$ } knots, {ebb $2\frac{1}{2}$ } knots.	N. by W. $\frac{1}{4}$ W.	Greatest rate, springs, {flood $2\frac{1}{2}$ } knots, {ebb $2\frac{1}{2}$ } knots.	N.N.W. $\frac{1}{4}$ W.	N. $\frac{1}{4}$ W.	N. by W. $\frac{1}{4}$ W.	Near the north point of Smith's Knoll the rates are, flood $2\frac{1}{2}$ , ebb $3\frac{1}{2}$ knots.
N.W. $\frac{1}{4}$ N.		N. by W. $\frac{1}{4}$ W.		North.	N. $\frac{1}{4}$ W.	N. by W. $\frac{1}{4}$ W.	
N.N.W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		N. by E.	N. by W. $\frac{1}{4}$ W.	N.N.W.	
N.N.W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		N.N.E.	N.W. $\frac{1}{4}$ W.	N.N.W.	
N.N.W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		E.N.E.	S. by W. $\frac{1}{4}$ W.	N.N.W.	
- - -		N.N.E. $\frac{1}{4}$ E.		S.E.	S. $\frac{1}{4}$ E.	Slack.	
S.S.E. $\frac{1}{4}$ E.		S.S.E. $\frac{1}{4}$ E.		S.E. $\frac{1}{4}$ S.	S. $\frac{1}{4}$ E.	S.S.E.	
S.S.E. $\frac{1}{4}$ E.		S.S.E. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ E.	S. by E. $\frac{1}{4}$ E.	S.S.E.	
S.S.E. $\frac{1}{4}$ E.		S. by E.		South.	S.S.E. $\frac{1}{4}$ E.	S.S.E.	
S. by E.		S. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.	E.S.E. $\frac{1}{4}$ E.	S.S.E.	
S.S.E. $\frac{1}{4}$ E.		S. by W.		South.	N.E. by N.	S.S.E.	

## COMPARTMENT XIV.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and  $3^{\circ}$  to  $5^{\circ}$  E. longitude.

S.W. Quarter.	Rate.	S.E. Quarter.	Rate.	N.E. Quarter.	Rate.	N.W. Quarter.	Rate.	REMARKS.
W.N.W. $\frac{1}{4}$ W.	Greatest rate, {flood $1\frac{1}{2}$ } knots, {ebb $1\frac{1}{2}$ } knots.	W.S.W. $\frac{1}{4}$ W.	Greatest rate, {flood $1\frac{1}{2}$ } knots, {ebb $1\frac{1}{2}$ } knots.	W. $\frac{1}{4}$ S.	Greatest rate, {flood $0\frac{1}{2}$ } knots, {ebb $1\frac{1}{2}$ } knots.	S.W. by W.	Greatest rate, {flood $0\frac{1}{2}$ } knots, {ebb $1\frac{1}{2}$ } knots.	In the north-eastern quarter of this compartment the Helgoland stream joins the Channel stream on the falling water at Dover, and the streams split on the rising water at Dover, and a vessel to the northward of $53^{\circ}30'$ on the rising tide will be set down towards Helgoland.
N.N.W. $\frac{1}{4}$ W.		W.S.W. $\frac{1}{4}$ W.		West.		N.W. by W. $\frac{1}{4}$ W.		
N. by W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.		West.		N.W. $\frac{1}{4}$ N.		
N. by E. $\frac{1}{4}$ E.		N.N.W.		N.N.W. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.		
N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. $\frac{1}{4}$ N.		N.E. by N.		
N.N.E. $\frac{1}{4}$ E.		N.E. by E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		E. by N.		
E. $\frac{1}{4}$ S.		E.N.E. $\frac{1}{4}$ E.		E. by S.		S.E. by E.		
S.E. $\frac{1}{4}$ S.		E.N.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		S.E. $\frac{1}{4}$ E.		
S. by E.		S.S.W. $\frac{1}{4}$ W.		S.E. $\frac{1}{4}$ E.		South.		
S. by W. $\frac{1}{4}$ W.		S.W. by S.		S.E. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		
S.W. $\frac{1}{4}$ S.		S.W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ E.		S.W. $\frac{1}{4}$ S.		Splitting on Texel Island.

## TIDAL STREAMS

## COMPARTMENT XV.

Between the latitude  $53^{\circ}$  and  $54^{\circ}$  N. and westward of longitude  $1^{\circ}$  E.

Hours.	Course.	Rate.	Spurn Light Vessel.		Dudgeon Light Vessel.	
			Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N. $\frac{1}{4}$ E.	Greatest rate, } flood $2\frac{1}{2}$ knots. } ebb $3\frac{1}{5}$ knots.	E.N.E.	Greatest rate, springs, $3\frac{1}{5}$ knots.	N. by W. $\frac{1}{4}$ W.	Greatest rate, springs, $2\frac{1}{5}$ knots.
	2 N.N.W. $\frac{1}{4}$ W.		S.W. by S.		N.N.W.	
	3 -		S.W. $\frac{1}{4}$ S.		N.W. $\frac{1}{4}$ N.	
	4 S.W.		S.W.		W. $\frac{1}{4}$ S.	
	5 S.W. $\frac{1}{4}$ W.		S.W.		S.W. $\frac{1}{4}$ S.	
	6 S.W. $\frac{1}{4}$ S.		S.W.		S. $\frac{1}{4}$ E.	
Before High Water, Dover.	5 S. $\frac{1}{4}$ E.	Greatest rate, } flood $2\frac{1}{2}$ knots. } ebb $3\frac{1}{5}$ knots.	S.W.	Greatest rate, springs, $3\frac{1}{5}$ knots.	S. by E. $\frac{1}{4}$ E.	Greatest rate, springs, $2\frac{1}{5}$ knots.
	4 S. by E. $\frac{1}{4}$ E.		N.E. by E.		S.S.E.	
	3 S.S.W. $\frac{1}{4}$ W.		N.E. by E. $\frac{1}{4}$ E.		S.E.	
	2 N. by E. $\frac{1}{4}$ E.		E.N.E.		E. $\frac{1}{4}$ S.	
	1 N.N.E. $\frac{1}{4}$ E.		E.N.E.		N.E. $\frac{1}{4}$ N.	

## COMPARTMENT XVI.

On the parallel of  $54^{\circ}$  N.

Hours.	$1^{\circ}$ E.		$2^{\circ}$ E.		$3^{\circ}$ E.		$4^{\circ}$ E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N. by W. $\frac{1}{4}$ W.	Greatest rate, 1 knot.	N.N.W. $\frac{1}{4}$ W.	Greatest rate, 1 knot.	N.W. $\frac{1}{4}$ W.	Greatest rate, 1 knot.	N.W. by W. $\frac{1}{4}$ W.	Greatest rate, 1 knot.
	2 N. by W. $\frac{1}{4}$ W.		N.W. $\frac{1}{4}$ N.		N.W. by W. $\frac{1}{4}$ W.		W.N.W. $\frac{1}{4}$ W.	
	3 N.W. by N.		N.W. $\frac{1}{4}$ W.		N.W. by W. $\frac{1}{4}$ W.		W. by N.	
	4 S. $\frac{1}{4}$ E.		W.N.W. $\frac{1}{4}$ W.		N.W. $\frac{1}{4}$ N.		N. $\frac{1}{4}$ W.	
	5 S. $\frac{1}{4}$ E.		W. $\frac{1}{4}$ S.		N. by W.		N.E. $\frac{1}{4}$ N.	
	6 S.S.E.		S. by E.		E. by N.		E. by N.	
Before High Water, Dover.	5 S.E. $\frac{1}{4}$ S.	Greatest rate, 1 knot.	S.E. $\frac{1}{4}$ S.	Greatest rate, 1 knot.	E.S.E. $\frac{1}{4}$ E.	Greatest rate, 1 knot.	E. $\frac{1}{4}$ N.	Greatest rate, 1 knot.
	4 S.E. by E.		S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.	
	3 E. $\frac{1}{4}$ S.		S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		E. by S.	
	2 N.E. $\frac{1}{4}$ N.		S.E. by E. $\frac{1}{4}$ E.		E.S.E.		S.E.	
	1 N. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.		S. by E. $\frac{1}{4}$ E.	

Hours.	$5^{\circ}$ E.		$6^{\circ}$ E.		$7^{\circ}$ E.		$8^{\circ}$ E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.W. by W. $\frac{1}{4}$ W.	Greatest rate, 1 knot.	W. by N.	Greatest rate, 1 knot.	West	Greatest rate, 1 knot.	E.N.E. $\frac{1}{4}$ E.	Greatest rate, 1 knot.
	2 N.W. by W.		W.N.W.		W.N.W.		N.E. $\frac{1}{4}$ E.	
	3 W.N.W.		W.N.W.		W.N.W.		N.W.	
	4 W.N.W.		W. by N.		W.N.W.		W.N.W.	
	5 W.N.W.		W.N.W.		W.N.W.		N.W. by W.	
	6 W.N.W.		W.N.W.		W.N.W. $\frac{1}{4}$ W.		W. $\frac{1}{4}$ S.	
Before High Water, Dover.	5 E.S.E. $\frac{1}{4}$ E.	Greatest rate, 1 knot.	S.E. by E. $\frac{1}{4}$ E.	Greatest rate, 1 knot.	S.S.E. $\frac{1}{4}$ E.	Greatest rate, 1 knot.	W. by S.	Greatest rate, 1 knot.
	4 S.E. by E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		S.S.W. $\frac{1}{4}$ W.	
	3 S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ E.	
	2 S.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		S.E. by E.	
	1 S.E. by E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.	

About the meridian of  $8^{\circ}$  E. the influence of the Elbe and Weser causes the stream to run nearly two hours to the north-eastward on the falling tide after it has turned westward in other parts, and on the rising tide to run two hours to the westward after the stream has turned eastward in a more westerly meridian.

## COMPARTMENT XVII.

On the parallel of 55° N.

Hours.	0° E.		1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.N.W.	½	Slack.		N.N.E.		W. ½ S.		N.W. ½ N.	
	2 S. by W. ½ W.	½	S.W. ½ W.		W.S.W.		W. ½ N.		N.W. ½ W.	
	3 S. by E.	1½	S.S.W. ½ W.		W.S.W. ½ W.		W. ½ N.		N.W.	
	4 S. ½ E.	1	S. by W. ½ W.		S.W. by W.		N.W. by W.		N.W. ½ W.	
	5 S. ½ E.	½	S. by W. ½ W.		S. ½ E.		S.W. by W. ½ W.		West.	
	6 S. ½ E.	½	S. ½ W.		S. by E. ½ E.		S. by E.		S.S.E. ½ E.	
Before High Water, Dover.	1 S.E. ½ S.	½	S. ½ E.		E.S.E. ½ E.		S. ½ E.		S.E. by E. ½ E.	
	2 N.N.E. ½ E.	½	E.N.E. ½ E.		E. ½ S.		S.E. by E.		S.E. by E. ½ E.	
	3 N. ½ W.	1½	N. by E. ½ E.		E. by N.		E. by S.		E. ½ S.	
	4 N. ½ W.	1	N.N.E.		E. ½ N.		E. by S.		E. ½ N.	
	5 N. ½ W.	½	N. by E. ½ E.		N.E. by E.		N.E. by N.		N. by E. ½ E.	

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.W.		W. ½ N.		W.N.W. ½ W.		N. by W. ½ W.	
	2 W.N.W. ½ W.		W.N.W.		W.N.W. ½ W.		N. by W. ½ W.	
	3 W.N.W. ½ W.		N.W. by W. ½ W.		N.W. by W. ½ W.		N.W. ½ N.	
	4 N.W. by W. ½ W.		W.N.W. ½ W.		W.N.W. ½ W.		N.N.W. ½ W.	
	5 W. ½ N.		W.N.W. ½ W.		W. by N.		N.W.	
	6 Turning.		N.W. by W. ½ W.		W. ½ S.		N.W. by W. ½ W.	
Before High Water, Dover.	1 E. ½ S.		S.E. ½ S.		S.W. ½ W.		W. ½ S.	
	2 E.S.E. ½ E.		S.E. by S.		S. ½ E.		S. by W. ½ W.	
	3 E.S.E. ½ E.		S.S.E. ½ E.		S.S.E. ½ E.		E. ½ S.	
	4 E.S.E. ½ E.		S.S.E. ½ E.		S.E. by S.		S. ½ E.	
	5 E. ½ S.		S.S.E. ½ E.		S.E. by S.		S. by E. ½ E.	

## COMPARTMENT XVIII.

On the parallel of 56° N.

Hours.	1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N.N.E. ½ E.		Slack.		N.W. ½ W.		N. ½ E.	
	2 Slack.		S.W. ½ W.		W.N.W.		N.N.W. ½ W.	
	3 S. ½ W.		S.W. ½ W.		N.W. ½ N.		N.W. ½ W.	
	4 S. ½ E.		W. by S.		N.W.		N.E. ½ E.	
	5 S. ½ E.		S. ½ E.		N. by W. ½ W.		N.E. by E. ½ E.	
	6 S. ½ E.		S. ½ E.		N. ½ W.		E. ½ S.	
Before High Water, Dover.	1 S.E. by E. ½ E.		E. by S.		N. by E. ½ E.		E. ½ N.	
	2 N.E. by E. ½ E.		E.N.E. ½ E.		N.E. ½ E.		E. ½ N.	
	3 N.E. ½ N.		E.N.E.		East.		N.E. by E. ½ E.	
	4 N.E. by N.		N.E. by E. ½ E.		N.E. by E.		E.N.E. ½ E.	
	5 N.E. ½ E.		N.E. by E.		North.		N.E. by E. ½ E.	



## TIDAL STREAMS

## COMPARTMENT XVIII—continued.

Hours.	5° E.		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 Turning.	Greatest rate at springs & knot about half tide.	Slack.	Greatest rate at springs & knot about half tide.	E.N.E. $\frac{1}{4}$ E.	Greatest rate at springs & knot about half tide.	N.E. $\frac{1}{4}$ E.	Greatest rate at springs & knot about half tide.
	2 W. $\frac{1}{4}$ S.		N.N.W.		N.E. by N.		N. $\frac{1}{4}$ E.	
	3 N.W. $\frac{1}{4}$ N.		N.N.W.		N. $\frac{1}{4}$ E.		N. $\frac{1}{4}$ W.	
	4 N. by W. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ W.		N. by W.	
	5 N.N.E. $\frac{1}{4}$ E.		N. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ W.		N. by W.	
	6 N.E. $\frac{1}{4}$ E.		N.N.E.		N. by W.		N. by W.	
Before High Water, Dover.	2 E.N.E. $\frac{1}{4}$ E.	Greatest rate at springs & knot about half tide.	N.E. by E. $\frac{1}{4}$ E.	Greatest rate at springs & knot about half tide.	N. by W.	Greatest rate at springs & knot about half tide.	N.N. W. $\frac{1}{4}$ W.	Greatest rate at springs & knot about half tide.
	3 N.E. by E. $\frac{1}{4}$ E.		E.N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ E.		N. by E.	
	4 E.N.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		E. $\frac{1}{4}$ S.		S. by W.	
	5 East.		E. $\frac{1}{4}$ S.		E. $\frac{1}{4}$ S.		S.W.S.	
	6 E. $\frac{1}{4}$ N.		E. by S.		S.E. $\frac{1}{4}$ E.		S.W. $\frac{1}{4}$ W.	

## COMPARTMENT XIX.

On the parallel of 57° N.

Hours.	2° W.		1° W.		°	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S. W. by S.	Greatest rate $1\frac{1}{2}$ knots at half tide.	S. by W. $\frac{1}{4}$ W.	Greatest rate $1\frac{1}{2}$ knots at half tide.	S. by W. $\frac{1}{4}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.
	2 S. W. by S.		S.W. $\frac{1}{4}$ S.		S.S.W.	
	3 S. W. $\frac{1}{4}$ W.		S.W.		S. by W.	
	4 N. $\frac{1}{4}$ W.		W.S.W. $\frac{1}{4}$ W.		S. by W.	
	5 Slack.		Slack.		S. $\frac{1}{4}$ E.	
	6 N.N.E. $\frac{1}{4}$ E.		N. by E. $\frac{1}{4}$ E.		Slack.	
Before High Water, Dover.	5 N.E. $\frac{1}{4}$ N.	Greatest rate $1\frac{1}{2}$ knots at half tide.	N.N.E.	Greatest rate $1\frac{1}{2}$ knots at half tide.	N.N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.
	4 N.E.		N.N.E.		N. by E.	
	3 N.E. by N.		N.N.E. $\frac{1}{4}$ E.		N. by E. $\frac{1}{4}$ E.	
	2 N.E. by N.		N.E. $\frac{1}{4}$ N.		N.N.E. $\frac{1}{4}$ E.	
	1 South.		E.N.E.		N. by E. $\frac{1}{4}$ E.	

Hours.	1° E.		2° E.		3° E.		4° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.S.W. $\frac{1}{4}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.	N. by E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.S.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.W. $\frac{1}{4}$ W.	Greatest rate $\frac{1}{2}$ knot about half tide.
	2 S.W. $\frac{1}{4}$ S.		S. $\frac{1}{4}$ E.		South.		N.W. by W. $\frac{1}{4}$ W.	
	3 S.S.W. $\frac{1}{4}$ W.		S. by E.		S. by W. $\frac{1}{4}$ W.		W.N.W.	
	4 S.W. $\frac{1}{4}$ S.		S.E. by S.		S.W. by W. $\frac{1}{4}$ W.		N. by W. $\frac{1}{4}$ W.	
	5 Slack.		E. by S.		Slack.		N. by W.	
	6 N.E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ N.		Slack.		N. by E.	
Before High Water, Dover.	5 N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	E. $\frac{1}{4}$ N.	Greatest rate $\frac{1}{2}$ knot about half tide.	Turning.	Greatest rate $\frac{1}{2}$ knot about half tide.	N.N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.
	4 N.E. by E.		E. by N.		N.E. by N.		N.E. $\frac{1}{4}$ N.	
	3 E.N.E. $\frac{1}{4}$ E.		East.		N.E. $\frac{1}{4}$ E.		N.E. by E. $\frac{1}{4}$ E.	
	2 E.N.E. $\frac{1}{4}$ E.		East.		E. by N.		E.N.E.	
	1 Slack.		S. $\frac{1}{4}$ E.		S.E. by E. $\frac{1}{4}$ E.		E. $\frac{1}{4}$ S.	

COMPARTMENT XIX.—*continued.*

Hours.	5°		6° E.		7° E.		8° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 N. by E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S. by E.	Greatest rate $\frac{1}{2}$ knot about half tide.	E.N.E.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.S.E.	Rate 0.9 knot.
	2 N.E. by N.		South.		E.N.E. $\frac{1}{4}$ E.		Slack.	
	3 S.W.		S. by W.		E.N.E.		N.E. by N.	
	4 N.N.W.		N.N.E.		E.N.E.		N.E. $\frac{1}{4}$ N.	
	5 N. $\frac{1}{4}$ W.		North.		E.N.E.		North.	
	6 N. by E. $\frac{1}{4}$ E.		North.		N.N.E.		N. by E.	
Before High Water, Dover.	3 N.E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N. by E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N.E. $\frac{1}{4}$ E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N.E. $\frac{1}{4}$ E.	
	4 N.E.		N.N.E. $\frac{1}{4}$ E.		N.E. by N.		N.N.E. $\frac{1}{4}$ E.	
	5 N.E. $\frac{1}{4}$ E.		N.E. $\frac{1}{4}$ E.		N.E.		N.E. by E. $\frac{1}{4}$ E.	
	3 E. $\frac{1}{4}$ N.		E. by N.		N.E.		N.E. by E. $\frac{1}{4}$ E.	
	1 East.		E. by N.		N.E.		E.N.E. $\frac{1}{4}$ E.	

## COMPARTMENT XX.

On the parallel of 58° N.

Hours.	3° W.		2° W.		1° W.		°	
	Course.	Rate.	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 South.	Greatest rate 1 knot about half tide.	S.E.	Greatest rate 0.6 knot about half tide.	S.S.W.	Greatest rate 1 knot about half tide.		
	2 S.E. $\frac{1}{4}$ S.		S.E.		S.S.W.			
	3 East.		S. $\frac{1}{4}$ E.		S.S.W.			
	4 E. by S.		S.E. $\frac{1}{4}$ S.		Slack.			
	5 Slack.		Slack.		N.N.W. $\frac{1}{4}$ W.			
	6 S.W.		N. by W.		N.N.E.			
Before High Water, Dover.	3 W. $\frac{1}{4}$ N.	Greatest rate 1 knot about half tide.	N.W. $\frac{1}{4}$ W.	Greatest rate 0.6 knot about half tide.	N.N.E. $\frac{1}{4}$ E.	Greatest rate 1 knot about half tide.		
	4 W.N.W. $\frac{1}{4}$ W.		N.W.		N.E.			
	5 N.W. by W. $\frac{1}{4}$ W.		N.W. by N.		N.E. $\frac{1}{4}$ E.			
	3 W. by N.		W. $\frac{1}{4}$ N.		S.S.E. $\frac{1}{4}$ E.			
	1 W. $\frac{1}{4}$ N.		S. $\frac{1}{4}$ E.		S.S.E. $\frac{1}{4}$ E.			

Hours.	1° E.		2° E.		3° E.	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.W.	Greatest rate $\frac{1}{2}$ knot about half tide.	S.W.	Greatest rate $\frac{1}{2}$ knot about half tide.	S. by E.	
	2 West.		W.S.W.		S. $\frac{1}{4}$ E.	
	3 Slack.		W.N.W. $\frac{1}{4}$ W.		S. $\frac{1}{4}$ W.	
	4 Slack.		N.W. $\frac{1}{4}$ N.		S.S.W.	
	5 N.N.E.		N. $\frac{1}{4}$ E.		S. $\frac{1}{4}$ W.	
	6 N.N.E.		N. by E.		E. by N.	
Before High Water, Dover.	3 N.N.E.	Greatest rate $\frac{1}{2}$ knot about half tide.	N. by E.	Greatest rate $\frac{1}{2}$ knot about half tide.	E.N.E.	
	4 N.N.E.		N. by E. $\frac{1}{4}$ E.		E.N.E.	
	5 N. by E. $\frac{1}{4}$ E.		N. by E.		E. by N.	
	3 Turning.		N.E. $\frac{1}{4}$ E.		E.S.E. $\frac{1}{4}$ E.	
	1 W. by N. $\frac{1}{4}$ N.		S.E.		S.E. by E.	

## TIDAL STREAMS.

## COMPARTMENT XXI.

On the parallel of  $59^{\circ}$  N.

Hours.	$2^{\circ}$ W.		$1^{\circ}$		$0$	
	Course.	Rate.	Course.	Rate.	Course.	Rate.
After High Water, Dover.	1 S.W. by S.	Greatest rate 1 knot about half tide.	S.S.W. $\frac{1}{2}$ W.	Greatest rate 0.5 knot about half tide.	W.S.W.	Greatest rate $\frac{1}{2}$ knot about half tide.
	2 S. by W. $\frac{1}{4}$ W.		S.W. by S.		W.S.W. $\frac{1}{4}$ W.	
	3 S. $\frac{1}{4}$ W.		S.W. by S.		N. by E. $\frac{1}{2}$ E.	
	4 S.W. by W. $\frac{1}{2}$ W.		Slack.		N.E.	
	5 W. by N.		Slack.		N.E. $\frac{1}{4}$ E.	
	6 N.W. $\frac{1}{4}$ W.		N. $\frac{1}{4}$ E.		N.E. by E.	
Before High Water, Dover.	3 N.N.W. $\frac{1}{4}$ W.	Greatest rate 1 knot about half tide.	N.N.W.	Greatest rate 0.5 knot about half tide.	N.E. by E.	Greatest rate $\frac{1}{2}$ knot about half tide.
	4 N.W. $\frac{1}{2}$ N.		N.N.W.		E. by N.	
	5 W.N.W.		N.W. by N.		S.E. $\frac{1}{4}$ E.	
	3 S.W. by W. $\frac{1}{2}$ W.		S.W. by W. $\frac{1}{4}$ W.		S.S.W. $\frac{1}{4}$ W.	
	1 S.W. $\frac{1}{4}$ W.		S.W. $\frac{1}{4}$ S.		W.S.W.	

All the foregoing bearings are magnetic.

**TIME**  
**OF**  
**HIGH WATER ON FULL AND CHANGE DAYS;**  
**WITH THE RISE OF THE TIDE**  
**AT SPRINGS AND NEAPS.**

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*As it is desirable that the following list should be made accurate and complete, it is requested that corrections and additions be forwarded to the Secretary of the Admiralty.*

# TIME

OF

## HIGH WATER ON FULL AND CHANGE DAYS

AT THE PRINCIPAL PLACES ON THE GLOBE;

Determined ACCORDING TO THE APPARENT PROGRESS OF THE TIDE WAVE;

*With the Rise of the Tide at Springs and Neaps.\**

Every, thus ?, is placed after the Time of High Water and the Rise, it indicates that what are given are approximations.)

e.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>England, South Coast.</i>							
	h. m.	ft.	ft.		h. m.	ft.	ft.
St. Agnes)	4 30	16	12	Teignmouth -	6 0	13	9½
St. Mary)	4 27	16	12	Torbay -	6 0	13½	10
Frescow)	4 22	16½	12½	Exmouth -	6 21	12½	8½
-	4 30	16½	12½	Lyme Regis -	6 21	11½	8½
Perran }				Bridport -	6 5	11½	7½
ve) -	5 0	14½	10½	Chesilton -	6 13	10½	7
-	4 35	14½	11½	Portland Breakwater	7 1	6½	4½
Strance)	4 43	15½	11½	Poole -	9 10		
-	4 57	16	12	-	12 45	6½	4½
Truro }	5 5	10	6	Christchurch -	9 0	5	
Quay) -	5 4	15½	12	-	11 30		
-	5 14	15	11½	Needles Point -	9 46	7½	5
-	5 26	16	13	Hurst, Camber -	10 0	7½	6
Seakwater	5 37	15½	11½	-	12 0		
utton }	5 32	15½	11½	Yarmouth -	12 0	7	6½
-	5 43	15½	11½	-	10 45		
Ok. Yard	5 45	15	11	West Cowes -	11 45	12½	9½
Tamar	5 47	14½	10½	-	10 25		
"	5 55	13½	9½	Lymington -	12 15	8	6
"	6 6	12½	8½	-	10 25		
m "	6 12	10½	6½	Beaulieu -	12 15	10	8½
"	6 17	5½	1½	-			
Quay, }	5 47	14½	10½	Calshot -	11 30	13	9½
Tavy }	5 47	8½	4½	(Castle Point) }	10 30		
R. Yealm	5 37	16½	11½	Southampton -	12 45	13	9½
St. Erme	5 40	16½	11½	-	10 42		
St. Avon	5 47	16½	11½	bridge - Red-	12 57	8½	6
-	5 45	15½	11½	Portsmouth Dock	11 41	12½	10
-	5 41	15	11½	Yard -			
Kings- }	5 46	10		Port-			
-	6 16	14½	10½	chester (off the	11 46	13½	10½
				Castle) -			
				Ports-			
				bridge (a ½ mile	11 48	6½†	4†
				W. of bridge) -			

\* Rise of the tide is meant its vertical rise above the mean low water level of spring-tides.

† Above the bed of the lake.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Portsmouth Fareham (in Channel close to the Upper Quay) -	11 48	11½	8½	Caermarthen (Bar)	6 10	26	19½
Bridge -	11 51	7½	4½	Caldy Island -	6 0	24?	16½
Ryde -	11 20	13½		Tenby -	6 0	27	20
Bembridge Point -	11 0	14	10½	Milford (St. Ann Lighthouse) -	5 56	24	18
Chichester -	11 30	14	11	Pembroke Dk. Yard	6 12	21	15½
Pagham (entrance)	11 30	16½	12½	Benton Castle, Cleddau R.}	6 23	20	14½
Selsea Bill -	11 45	16½	12½	Landshipping "}	6 27	20	14½
Littlehampton -	11 36	16	11½	Little Milford}	6 31	19	13½
Arundel (Bar)	11 35	16	11½	Quay "}	6 42	7½	2½
Arundel (Town) -	12 25			Haverfordwest "}	6 0	21	
Shoreham -	11 34	18	13½	Smalls Light-house "}	6 0	17	
Brighton -	11 15	19½	16	Ramsay Sound -	6 0	17	
Newhaven -	11 51	20	15	Fishguard -	6 56	11½	8½
Beachy Head -	11 20	20	15	Newport -	7 0	12	9
Hastings -	10 53	24	17½	Cardigan -	7 1	12	9
Rye Bay -	11 20	22	17½	New Quay -	7 30	15	
Dungeness -	10 45	21½	19	Aberystwyth -	7 31	13½	10
Folkstone -	11 7	20	16½	Aberdovey -	8 0	15	
Dover -	11 12	18½	15	Sarn-y-bwch Reef-	7 40	14	
Deal -	11 15	16	12½	Barmouth -	7 41	17	13½
Ramsgate -	11 44	15	12	Sarn Badrig -	7 30	13	
<i>England and Wales, West Coast.</i>				Port Madoc -	7 30	17	
Scilly Isles -	4 30	16	12	St. Tudwall Road-	7 45	14	
(St. Agnes) -				Pwllheli -	7 46	13½	9½
Scilly Isles -	4 27	16	12	Bardey Id. -	7 40	15	
(St. Mary) -				Porth-dyn-lleyn -	8 30	16	
Cape Cornwall -	4 35	18?	13?	Caernarvon -	9 33	13½	10½
St. Ives -	4 44	21	15	Holyhead -	10 11	16	12½
Padstow -	5 13	20½	16½	Amlwch -	10 30	18?	13½
Boscastle -	5 15	25	17½	Beaumaris -	10 32	21½	16½
Budehaven -	5 45	23	17	Air Point, R. Dee	10 54	25	19
Lundy Island -	5 15	27	20	Chester (Crane	12 16	26	
Barnstaple (Bar)	5 30	19	14	Wharf) -			
Barnstaple (Bridge)	6 28	10½	7½	Liverpool -	11 23	26	20½
Appledore -	5 58	23	16½	Formby Point -	10 35	28	
Bideford -	6 7	16	12	Ribble Lighthouse	10 51	24	17
Ilfracombe -	5 42	27½	21½	Preston -	11 49	10	4
Minehead -	6 30	35	26½	Fleetwood (Wyre Lt)	11 11	27	20½
Bridgewater Bar -	6 50	35	26½	" (Port)	11 12	26½	19½
Weston-super-mare	6 54	37	28½	Lancaster -	11 16	8½	
Flatholm Islands -	6 54	37?	28?	Poulton-le-Sands -	11 26	27½	21½
Portishead -	7 16	41½	31	Piel Harbour (Pier)	11 5	28	21
Bristol (King Road)	6 56	44	33	Whitehaven -	11 14	23½	18½
Chepstow -	7 30	38	28½	Port Harrington -	11 5	26	19
Newport -	7 10	38	29	Workington -	11 4	20	15
Cardiff -	6 59	38	29	Maryport -	11 3	18	13
Nash Point -	6 25	33	25	Abbey Head -	11 10	23	17½
Swansea (Mum- bles Lighthouse) }	6 1	27½	20½	Southernness -	11 20	28	
Porth Cawl -	6 8	28½	21½	Annan Foot -	11 56	20	14
Burry Port -	6 1	25½	18½	Port Carlisle -	12 10	20	14
Ferry Side -	5 49	23	16½	Point of Ayr -	11 7	20?	16?
Llanely (Bar) -	6 16	28	21	Douglas, I. of Man	11 12	20½	16
				Ramsey "}	11 12	19½	16
				Peel "}	11 8	16½	13
				Calf Sound "}	11 17	16½	13
				Port St. Mary "}	11 10	20	16
				Castletown "}	11 10	20	16

ace.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Scotland, West Coast.							
	h. m.	ft.	ft.		h. m.	ft.	ft.
Faru Point)	11 22	23	18	Duart, I. of Mull -	5 0	12	10
right -	11 10	23		Loch Aline -	5 33	13½	10½
Stewart }	12 0	12	6	Tobermory, Mull I.	5 36	13	9½
Quay) -				Loch Cuan " -	5 36	13	9½
-	11 30			Loch Sunart -			
wn -		17	12	Iona Sound -	5 11	11½	8½
liam -	11 10	18	10	Bunessan -	5 24	12	8½
alloway -	11 15	15½	12½	Loch Tadh (Go-	5 29	11½	8
ick -	11 10	15	12	metra) I. of Mull }			
an -	11 12	11	8	Scarnish, Tiree I.	5 31	11½	8½
antyre -	10 35	4		Arinagour, Coll I.	5 41	12½	9½
ton -	11 45	8½	6	Loch Moidart -	5 44	13½	9½
-	11 49	10	7	Eigg Island -	6 15	14	10
-	11 50	8½	7½	Arasaig -	5 50	13½	10
-	11 50	10	7½	Loch Nevis -	5 47	14½	10
n -	11 45	10	8	Loch Hourne -	5 45	13½	10½
Head -	11 49	10		Ornsay, I. of Skye	5 50	14½	10½
Great }	11 50	10	6	Kyle Rhea -	6 0	15	11
ae -				Loch Duich -	6 0	15½	11
-	11 50	10		Loch Alsh (Kyle	6 16	15½	11
-	0 8	9½	8½	Akin) -			
gow -	0 18	9		Loch Carron }	6 29	16½	11½
on -	0 20	9		(Plockton) -			
-	0 39	9		Portree, I. of Skye	6 32	15	10½
Canal Ent.)	1 15	9	7½	South Rona, Light	6 20	14½	10½
-	1 25	9		House -			
g -	12 6	12		Loch Torridon -	6 20	15	11
l -	12 6	10	6	Barra, North Harb.	5 48	11½	8½
van -	11 55	6		Canna Island -	6 19	14	9½
s, Kyles }	11 50	10	8	Loch Boisdale, }	5 47	12½	9½
-				South Uist -			
s -	11 50	9	6	Benbecula -	6 3	11½	8½
g, Loch }	11 53	9	7½	Loch Skipport -	5 32	12½	9
-				Loch Dunvegan }			
-	12 0	10		(Dunvegan Cas-	6 7	15½	11
und -	2 22	4	2½	tle, I. of Skye) }			
n, Islay -	5 0	5	4	Kallin, North Uist	5 59	13½	9½
lin Ferry -	4 41	6½	4½	Monach Is. (Shillay)	5 44	12½	8½
all Isles -	5 3	3½	2½	Loch Eport, N. Uist	6 6	12½	9½
-	4 49	6½	5	Loch Maddy, }	6 6	12½	9½
land -	5 2	11½	7	North Uist }			
(Schal- }	5 18	11	7½	Vallay -	6 10	11½	8½
-				Berneray I. (Sound	6 11	13	9½
-	5 28	10	7½	of Harris) -			
ound -	5 10	10-12		Obb of Harris -	6 16	11½	8½
an, Loch }	5 31	9	6½	East Loch Tarbert	6 10	13½	10
n -				West Loch Tarbert	6 4	11½	8½
-	5 22	12	9½	Loch Seaforth }	6 16	15	10
Loch }	7 3			(Athline) -			
-				Loch Clay -	6 9	14½	9½
in, Loch }	7 54	5½	8½	Loch Ewe (Poolewe)	6 39	14½	10½
-	5 26	12½		Loch Broom -	6 40	14½	10½
ish, -				(Ullapool) }			
evan -	5 43	11		Tanera, Summer I.	6 37	14	10½
och Aber -	5 43	12	8½	Loch Inver -	6 41	14	11
" -	5 59	11½		Loch Erisort, }	6 43	15½	11½
Head of }	6 27			Lewis Id. -			
-				Stornoway -	6 46	13½	9½
				Loch Roag (Ber-	6 11	11	8
				nera) Lewis I. -			



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>England, East Coast.</i>							
St. Kilda -	h. m.	ft.	ft.	Holy Island Harb.	h. m.	ft.	ft.
Rockall -	5 30			North Sunderland	2 30	15	11½
Loch Laxford -	6 44	12	11½	Coquet Road -	2 30	15	11½
Cape Wrath -	7 30	15½		Blyth -	3 0	14½	11
Loch Eriboll -	7 43	14½	11	Tyne River (Bar)	3 15	15	11
Loch Tongue -	7 53	15	12	" North Shields	3 20	14½	11
Thurso -	8 28	14½	11	(Low Lt. Hse.)			
Stroma, S. side -	9 47	9	6½	" Howden -	3 23	13½	10
Swona, E. side -	10 24	10	7½	" Walker -		12	
" W. side -	9 35	10	7	" Newcastle -		10½	
Great Skerry, E. side -	11 4	9½	6	" Newcastle -	4 23	10½	
" W. side -	10 53			Sunderland -	3 22	14½	11
<i>Orkneys.</i>				Seaham -	3 24	14½	10½
Stromness -	9 0	10	7½	Hartlepool -	3 28	15	11½
Westness -	9 11	10	7½	Tees River, Bar -	3 45	15	
Kirkwall -	10 9	10	7½	" Middlesbrough	3 55	13	
Deer Sound -	10 30	10	7½	" Stockton -	4 40	11	
Widewall -	9 3	10	7½	Whitby -	3 45	15	11½
Otterswick -	9 13	11	8	Scarborough -	4 11	15½	12½
<i>Shetland Isles.</i>				Filey Bay -	4 20	16	12½
Balta -	9 45	6	4½	Flamborough Head	4 30	16	12
Lerwick -	10 30	6	4	Bridlington -	4 39	16	12
Hillswick, or Urie } Firth -	9 45	6½	5	Humber River, } Spurn Point -	5 26	18½	15
Sealloway -	9 30	5½	4½	" Grimsby -	5 36	19½	15
Sumburgh Head -	9 45			" Killingholme	6 2	19½	15½
Fair Isle -	11 0	5	3	" Hull -	6 29	20½	16½
<i>Scotland, East Coast.</i>				Humber Ouse } River, Goole -	7 44	14	
Duncansby Ness -	10 14	10	7	Boston Deep, Clay } Hole -		21½	
Wick -	11 22	10	7½	" Hob Hole -		17	
Dornock Road -	11 47	11		" (Sluice) -	7 0	12	
Cromarty -	11 56	14	11	Lynn Deep, Long } Sand -	6 0	23	
Inverness (Kellock Pier) -	12 18	12	9½	" Lynn Road -		20	
Banff -	0 28	10½	8	" Lynn -		18	
Fraserburgh -	0 40	11	8½	Wisbeach Eye -		20	
Peterhead -	0 34	10½	8½	Sutton Bridge -		18	
Aberdeen -	1 0	12	10	Wisbeach -	7 30	15	
Stonehaven -	1 10	14	11	Wells Bar -	6 20	18	
Montrose -	1 25	13	10	Wells -	7 0	12	
Arbroath -	1 35	14	11	Blakeney Bar -	6 30	15	
Tay River (Bar) -	2 6	16	14	Blakeney -		9	
Broughty Ferry -	2 22	14½	11	Cley -		5½	
Dundee -	2 32	14½	11½	Cromer -	7 0	14½	11
Perth -	3 35			Leman Shoal -	6 0		
Cockenzie, Firth of Forth -	2 16	15½	13	Ower Shoal -	6 30		
Leith -	2 17	16½	12½	Hammond Knoll -	7 40		
Granton Pier -	2 20	16	12½	Winterton Ridge -	7 50		
Burntisland -	2 24	16½	12½	Yarmouth Road -	9 15	6	4
Queensferry -	2 37	18	14	" Haven, Brush } Bridge -		5½	4½
Kincardine -	2 53	17½	15	Lowestoft -	9 57	6½	5½
Alloa -	3 18	17½	15	Blyth River, South } wold -	10 20	6½	4½
Stirling -	3 52	7½	4½	Aldbrough -	10 45	8½	6½
Dunbar -	2 8	14½	11	Kentish Knock -	11 47		
Eyemouth -	2 15	15½	11½	Orfordness -	11 15	8	6½
Lerwick -	2 18	15	11½				

Locality.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
aven Bar	11 30	8?	6?	Youghal	5 14	12½	10
ay	12 36	7½		Ballinacourty,	5 12	12½	9½
ghden	1 0	7½		Dungarvan	5 27	12½	9½
Bridge	3 0	6		Dunmore	5 20	12½	10
Haven	11 45	12	9	Waterford (Dun-	6 6	13½	10½
ston Quay	12 35	10		cannon Fort)	6 4	12½	10
ord Bridge	12 55	7		(Bridge)	5 40		
Harbour	12 6	11½	9½	New Ross	7 21	5	3½
	12 6	12½	10	Saltees	8 30	4½	3
ver, Pin-	12 20	12		Kilmichael Point	8 45	4	3
ill	12 27	12		Arklow	10 29	9	6½
wnham	12 35	13½		Wicklow	10 45	12	9½
each	12 29	12		Bray Head	10 45	13	11
er,	12 35	13½		Dalkey Island	11 10	11	8½
swich	12 29	12		Kingstown	11 12	12 - 14	9 - 11
River,	12 48	11½		Dublin Bar (Pool-	11 9	13	10
ss	1 8	4½		beg Lt. House)	11 15	10	8
ley Quay	12 0	14	10	Malahide Inlet	11 15	10½	8
awade	12 10	15	10½	Rogerstown Inlet	11 0	13	10
ridge	12 0	14½	10	Skerries Islands	10 40	11	
rt, Colne	12 10	15	10½	Balbriggan	11 0	11½	9
enhoe	12 0	14½	10	Drogheda (Bar)	10 56	13½	11½
rt River,	12 20	12	8	Dundalk	11 2	14	11½
oint	12 32	10	6	Greencastle Point	11 0	14	11
bridge	11 40	12	8	Carlingford (Bar) or	11 10	14½	12
River,	12 5	14½	10½	Cranfield Point.	10 30	16	12
nd, N.E.	12 25	16	11	Warrenpoint	11 0	16	12
River,	12 5	14½	10½	Newcastle	10 58	13	10½
ll Bridge	12 25	16	11	Lough Strangford	10 53	14	11½
ght	12 5	14½	10½	(Killard Point)	12 31	10½	8½
	11 40	15½	13	„ Strangford	12 45	11	9½
ole	12 0	15½	13	Quay	12 42	11½	9½
	12 30	15½	13	„ Quoile Quay	12 40	11	9½
	0 37	16	13½	„ Kirenbbin	12 44	11½	9½
	1 2	17½	14	„ Killyleagh			
	1 10	17½	14	Head of the Lough			
	1 37	18½	15½	(Turley Rocks)			
	1 43	19	15				
	1 57	19½	17				
ocks	2 7	19½	16½				
ridge							
<i>Ireland, South and East Coasts.</i>							
r	4 0	9	6½	Cape Clear	4 0	9	6½
	4 23	10½	8½	Skull	4 2	9½	7½
send	4 21	10½	8	Crookhaven	4 9	9½	8
Bay	4 30	11	8½	Dunmanus Harbour	3 57	9½	7½
Sherry	4 36	10½	8½	Dunbeacon	3 51	10½	7½
	4 43	11½	9	Black Ball Harbour	3 40	9½	7½
rn	5 1	11½	9	Castletown, Bear-	4 14	9½	7½
Penrose	4 58	12½	10	haven	3 47	10	7½
	4 54	12	9½	Bantry Harbour	3 42	10½	7½
				Kenmare R., Bal-	3 45	10½	8
				lycrovane	3 43	10	7½
				„ Dunkerron	3 52	10	7½
				„ Ormond	3 40	12	7½
				„ West Cove			
				Ballinskellig Bay			



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Bessin -	8 57	20	15½	Elbe, Hamburg -	5 29	6½	
les -	9 7	20	15½	Eider, Tonning -	2 1	9	
m -	9 38	21	16	" Friederich-	2 37	9	
-	9 36	21	17½	stadt -			
-	9 39	21	16	Eider, Rendsborg -	7 42	4	
-	9 29	23½	18	Husum -	2 36	9	
uf -	10 6	9½	7½	List -	2 21	6	
-	10 57			Hierting -	2 45	5	
-	9 51	22	18	Nyminde Gab -	2 41	2	
-	2 28			Thorsminde -	3 34	2	
-	10 44	23½	18	Blaavand or Horn	1 44	5	
y-en-Caux	10 46	27	21½	Point -			
-	11 6	27	20½	Aggerminde -	4 9	2	
-	11 9	27	21	Hirtshals -	4 28	1	
-	11 5	27½	21	Skagen or the Skaw	5 56	1	
-	11 26	27½	21	Bergen -	1 30	4	
lery-sur- }	11 46	27	21½	Romdals Islands -	10 45	6	
-	11 25	25	19½	Ramso Fiord -	10 45	7	
isnez -	11 27	21½	16½	Oxbaasheia, Svec	12 0	8	
-	11 49	19½	15½	Fiord -			
es -	12 0	19	15	Trø Islands -	11 45	7	
ue -	12 8	16½	13½	Værø -	12 0	9	7½
				Lofoten Islands -	12 0	9	7½
				Tromsø -	1 45	8	
				Hammerfest -	1 10	9	
<i>North Sea, East Coast.</i>				<i>Færoe Islands.</i>			
-	12 18	16	13	Fugloe Fiord -	11 15	6½	4½
-	12 25	19	15	Svinøe Fiord -	12 0	6½	4½
berg -	12 48	13	11	Leervig Fiord -	0 30	6½	4½
-	3 15	15		Miaveness -	3 12	6½	4½
-	1 20	15		Naalsøe Fiord -	4 0	6½	4½
-	4 25	15		Skaapen Fiord (be-			
-	1 20	15	8	tween Stormoe	5 0	9½	7½
npot -	12 30	12		and Sandoe) -			
-	2 0	11	9	" (between Hestoe	5 30	9½	7½
shaven -	2 15	10	8	and Sandoe) -			
West Gat) -	1 45	7		Waagøe Fiord -	6 0	9½	7½
tsluis -	2 30	8	6	Westmanshaven -	8 0	9½	7½
-	3 0	5		Suderoe Fiord -	6 0	9½	7½
-	3 45	7		Myggenæs Fiord -	9 0	9½	7½
-	2 30	5		Eides Fiord -	11 0	9½	7½
tside shoals)	6 30	4	3½				
-	7 0	12					
liep -	7 27	4	3½				
ling (West)	8 40	6	5				
l Gat -	9 0	7					
Hollum Rd.	11 30	7					
er buoy) -	10 0	8-10					
(road) -	10 30	8-10					
-	11 15	8-10					
-	12 0						
ey -	10 30	8					
outer light }	11 30						
-							
Oog -	12 0	9?					
id -	11 33	9½	7				
trance -	12 0	11					
ixhaven -	1 8	10					
unsbattel -	1 58	9					
uckstadt -	3 9	10					
tona -	5 19	7					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>White Sea.</i>							
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
Inkanskie -	9 15	14		Walvisch Bay -	1 54	6	
Turna Bay -	9 54	11		Port Alexander -	3 0	5	
Trek Island -	10 48	20		Great Fish Bay -	2 30	5 - 6?	
Litke Bank -	11 45	15		Little Fish Bay -	2 30		
Cape Kanushin -	11 54	15		Lobito Bay -	2 20	5	
Sosnovets -	11 44	18		Benguela -	2 30	5?	
Morjovets I. -	11 20	17		St. Helena Island -	3 11	3	
Cape Voronov -	11 20	17		Ascension Island -	5 30	2	
Intsi Point -	11 55	16		San Paul de Loanda	4 30	5	
Kouloi River -	1 15	20		River Congo	4 30	6	
Mexen -	1 48	15 - 22		Mayumba -		7	
Kerets Point, Gulf	4 30	5½		River Gaboon -	5 30	3	
of Arkhangel - }				Cape Lopez -	4 30	4 - 6?	
Nikolskoi Tower "	6 0	2		Corisco Bay }	5 0	7	
Moudiuga I. "	5 50	3½		(Elobey Isles) - }			
Dvina Bar -		3½		Anno Bom Id. -	3 45	5	
Arkhangel "	7 28	2½		St. Thomas Id. -	3 25	4½	
Nikolskoi Chan. "	5 25	3		Princes Id. -	3 45	4½	
Gribanika Pt. "	4 50	3		Fernando Po -	4 0	7	
Jijginsk I. -	5 15	4		Cameroon River -	4 0?	6	
Cape Orlov Letni, }	5 18	4		Bonny and New	5 0	9	
Gulf of Onega - }				Calabar Rivers- }			
Onega River -	9 17	6 - 7		Brass River -	4 0	6	
Souma -	6 30	5½		River Niger, Nun }	4 8	6	
Solovet Road -	5 0	4		(entrance) - }			
Kyem River -	5 23	4		" Benin -	4 30	7	
Kalgalaksha -	6 50	7		" Middleton -	4 15	5	
Keret, Gulf of }	3 8	6		" Pennington -	4 15	5	
Kandalak - }				" Dodo -	4 17	5	
Kovda Bay -	3 25	6		" Ramos -	4 20	5	
Kandalaksha "	3 25	7		" Forçados -	4 22	5	
Sosnovaia Bay "	2 40	6		" Lagoa (Bar) -	6 0	3	
Kou Zomen -	3 30	6		" " Consulate }		2	
Tetrina -	3 17	7		" " Wharf }			
<i>Nova Zembla.</i>				" Palaver Ida. -		1	
Hakluyt Head -	1 30	4		Cape Coast Castle -	4 30	6	
<i>Spitzbergen.</i>				St. George d'Elmina	4 30	6	
Bell Sound -	8 56	3½		Cape Three Points-	4 0	4	
<i>Africa, West Coast.</i>				Axim -	4 30	4	
<i>(From Cape of Good Hope to the Northward.)</i>				Grand Lahou -	4 20	4	
Simons Bay -	2 44	5½	3½	Tabou River -	4 45	3 - 4	
Hout Bay -	2 20	5		Cape Palmas -	4 30	4	
Table Bay -	2 40	5		Sinou -	5 0	4	
Saldanha Bay -	2 0	6		Sangwin River -	5 15	4	
St. Helena Bay -	2 30			Grand Cestos -	5 20	4	
Roodewall Bay -	2 30	6½		Edina -	5 50	4	
Hondenklip Bay -	2 30	5½		Junk River -	5 45	5	
Mc. Dougall Harb.	2 30	5½		Monrovia -	6 0	6	
Port Nolloth -	2 30	5½		Gallinas River -	6 45	4	
Elizabeth Bay -		5 - 6		Gilmorris Id. }	6 0	11	
Angra Pequena -	2 30	8		Sherbro River- }			
Ichabo Island -	1 0	6	4	Edmonstone Id. "		8	
Spencer Bay -	10 50	5 - 6		Bagroo River "		11	
Port d' Ilheo -	3 0	8 - 10		Banana Islands -	8 15	9	
				Sierra Leone -	7 55	8	
				Yellaboi Island -	7 10	10	
				Scarcies Rivers -	7 10	10	
				Mellacoree R. -	7 40	11	
				Forecarreah R. -	7 40	11	
				Mahneah R. -	7 40	11	
				Isles de Los -	6 35	13	

No.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ga -	7 30	12	9½	Mondego (Bar) -	2 30	7	
z -	10 0	15	11½	Oporto -	2 30	10	
ponce -	10 0	15	11½	Fayal, Azores -	11 45	4	
ls., Or-	10 0	11		Terceira -	12 32	4½	
annel -				St. Michael -	12 30	6	
Arcas -	10 10	11 - 14	9	Funchal Bay, Ma- deira -	12 48	7	
Bisao-	11 0	8		Vigo -	3 0	12 - 13	
heo -	7 45	8		Cape Finisterre -	3 0		
bia -	8 10	6 - 9		Port Camariñas -	3 0	15	
liver -	8 10	6		Corunna -	3 0	15	
r -	8 10	6		Ferrol -	3 0	15	
-	7 45	2½		Cedeira -	3 0	15	
Bar) -	8 42	6		Vivero -	3 0	15	
(Guet)	8 42	6		Rivadeo -	3 0	15	
'dar) -	10 0	6		Barquero (entrance)	3 0	15	
St. Louis)	7 45	5		Gijon Bay -	3 15	15	
rde Ids.	6 0?	5		St. Martin de la	3 30	15	
ya -	10 0	6		Arena -	3 30	15	
-	12 0	6		Santander -	3 30	15	12
ay -	12 0	6 - 7		Santona -	3 30	12½	10½
r -	11 46	8		Bilbao (Bar) -	3 0	13	
co -	12 0	8?		Olaveaga -	3 15	12	
ador -	12 0	8		Bilbao (Town) -	3 20	9	
-	12 30?	9?		St. Sebastian -	3 0	12	9
ary Ids.	12 30?	9?		Port Passages -	3 0	12	9
" -	12 45?	9?		Socoa -	3 19	12½	8
" -	1 0?	9?		Bayonne (Bar) -	3 45	12	10½
" -	1 30	8	6	Boucaut, Adour R.	3 39	8½	6
,Tenerife	12 52	10		Arcachon -	4 37	11½	9½
la Luz,	12 45	9		Cordouan Lt. house	3 37	13½	10½
anaria -	1 18	10 - 12		Royan -	3 38	13½	10
uz or -	10 0	10		St. Surin -	4 11	14½	11
-	1 46	9 - 12		Bordeaux -	6 50	14	12½
-	1 30	9 - 12		Iled'Aix,Charente	3 20	17	12½
-	1 42	8		R. Entrance -			
-	2 6	3½	2½	Ile d'Oleron -	3 50	19	
-	2 23	2½	1½	Rochefort -	4 6	17	13
letta) -	3 10	7	5	Rochelle -	3 31	17	13
-				Les Sables d'Olonne	3 26	14	10
				Seudre River (en- trance, -	3 31	15	11½
				Ile d'Yeu -	3 6	14½	10
				Ile de Noirmoutier	3 2	16	11½
				Port Navallo -	3 42	13	9½
				St. Nazaire -	3 10	15½	11
				Port le Palais, } Belle Ile -	3 18	14½	10½
				Port Louis, L'Orient	3 11	13	9½
				Concarneau -	3 12	13	9½
				Penmark Rocks -	3 16		
				Glenan Is. -	3 12	13	10
				Ile de Sein -	3 21	17½	12
				Brest -	3 47	19	13½
				Conquet Road -	3 46	21	15
				Ushant -	3 32	19½	13½
<i>Europe, West Coast.</i>							
-	12 0	3		<i>South America, East Coast.</i>			
old Mole	2 20	3½		<i>(Cape Horn to the Northward.)</i>			
-	1 49	4	2½	St. Martin Cove, }	3 50	8	
-	1 46	6	3½	Cape Horn Ids. }			
-	1 45	9½					
-	1 24	12½	8				
l Rocks -	1 27	12½	8				
-	1 34	12½	8				
r -	1 53	12½	8				
-	2 0	12½	8				
-	1 18	11½	7½				
-	2 7	13					
-	2 30	8					
belem)	2 30	12	9				
-	1 54						

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Cape Peñas -	6 42	12		Port Belgrano -	6 0	12	10
Cape San Diego -	4 30	10		Tristan d'Acunha -		8	
Orange Bay -	3 30	6		*RiodelaPlata, (C. } Castillos) }	8 30	2	
Goree Road -	4 0	8		„ Buenos Ayres	12 0	3-5	
Le Maire Strait -	4 0	7		„ Barragan Bay	7 0	5-9	
Staten Island -	4 30	8		Rio Grande do Sul		1½-2	
San Sebastian Bay	7 0			Santa Catharina I.	2 30	3	
<i>Falkland Islands, East Falkland.</i>				San Sebastian -	2 0	4	
Berkeley Sound -	5 0	7		Ilha Grande -	12 30	5	4
Port William -	5 15	7	5½	Rio Janeiro -	3 0	4	3
Port FitzRoy -	4 45	6		Porto Frio -	2 40	4½	
Port Pleasant -	5 0	6½		Macahé -	2 30	9½	
Island Harbour, } Choiseul Sound	5 20	6		Benevente -	3 0	5	
Mare Harbour -	6 0	6		Espirito Santa } Bay, and Port }	3 0	4	
Darwin Harbour -	6 30	5½		Victoria -			
Walker Creek -	6 20	5½		Abrolhos -	3 20	6-7	
Low Bay -	5 0	5½		Martin Vas Rocks	3 45		
Adventure Sound	5 30	5½		Os Ilheos -	4 30		
Bay of Harbours -	6 0	5		Bahia -	3 30	8	
Falkland Sound N. } entrance	6 45			Maceio -	4 30	8½	
„ S. entrance	7 0			Pernambuco -	4 45	8	6
Ruggles Bay -	7 30	5		Parahiba -	5 0	9-12	
Port King -	7 30	5		Cape St. Roque -		8-10	
„ Sussex -	8 15	6		As Rocas -	5 15	10	
„ San Salvador	8 10	8		Fernando Noronha	4 0	6	
„ San Carlos -	7 0	8		Aracati -	6 0	8	6
<i>West Falkland.</i>				Ceara -	4 30	9	
Port Stephens -	7 45	7½		Jericoacoara -	11 30	12	9
„ Albemarle -	7 15	7		Maranhão -	7 0	16½	10½
„ Edgar -	7 15	6		San Joao -	6 24	14	
Fox Bay -	7 0	6		Para -	12 0	11	10½
Manybranch Harb.	7 40	7½		Cayenne River -	3 45	6-11	
Port Egmont -	7 30	11		Maroni River -	5 30	8	
Hope Harbour -	8 10	7		Surinam -	6 0	5½	
Shallow Harbour -	9 30	6		Corentyn River -	5 10	8½	6
ShipHarbour, New } Island - }	10 30			Berbice -	4 30	11½	6
<i>South America, East Coast—continued.</i>				Demerara River -	4 45	9	6
Coy Inlet -	9 30	40		Orinoco R. entr.)	6 0	3	
Port Gallegos -	8 50	46		Chacachacare Id. }			
Santa Cruz River -	9 30	40	29	Trinidad -	3 30	4	
Port San Julian -	10 45	30		Dragons Mouth „	3 0	4	
„ Desire -	12 10	18½		Port Spain „	4 30	4	3
„ Melo -	3 40	15		Tobago -	irr.	3½	
„ Santa Elena -	4 0	17		Cartagena -	11 0	1½	1
Nuevo Gulf -	7 0	10		Caledonia Harbour	11 40	1½	1
Port San Josef -	10 0	30	25	<i>Caribbean Sea and the Bahamas.</i>			
Sea Bear Bay -	12 45	20		Grenada, (St. } George Harb.) }	2 40	1½	½
Port San Antonio -	10 40	28		Grenadines -	3 0	1½	1
Rio Negro -	11 0	14		Barbados -	irr.	2	
San Blas -	2 0	12	10	Martinique (Robert } Harbour) }		4-5	
Colorado River -	4 0	9	7½	English Harbour, }			
Union Bay -	3 10	12	9	Antigua -		2	
				Anegada -	9 0	1½	
				Gorda Sound, }	8 30	1½	
				Virgin Island - }			

\* In the Rio de la Plata the rise is greatly influenced by the winds, the water being raised by S.E. winds and depressed by those from N.W., causing at Buenos Ayres a difference sometimes of 12 feet.

Loc.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.	<i>Bermudas.</i>			
	8 30	1½			h. m.	ft.	ft.
or Pass- and stead, Cruz a, Porto	9 0	1		Ireland Id. Dock } Yard - - }	7 14	4	
	7 30	¾		<i>North America, East Coast. (Isthmus of Panama to the Northward.)</i>			
	8 2	1½		Greytown - -	9 0	1½	
	6 45			Blewfields - -	1 50	2	
	8 0	3½	2½	Corn Islands - -	1 45	2	
vos	9 30	3	2½	Colombilla Cay, }			
ays	7 0	4		Pearl Cays }	2 0	2	
Island	7 0	2½		Cape Gracias Harb.	10 30	2	
	7 20	2½		Royal Harbour, }			
and	7 45	3½		Ruatan }	7 45	3½	
harbour, sland - }	8 30	4	3½	Serranilla Bank -	irr.	2	
sland	8 0	3		Serrana Bank -		2	
Reef -	7 40	3		Old Providence -	irr.	1	
y -	7 40	3		Bonacca Island -	9 0	1½	
Kay	7 40	3		Mugeres Harbour	9 30	1½	
ew Pro- }	7 30	4	3	Cozumel - -	8 30	1½	
	7 30	4		Cape Catoche -	9 30	1½	
	8 15	4	3	Campeche - -	1 45	2½	2
Sound -	8 15	4	3	Sisal - -		2	
load -	8 30	4	2½	Laguna de Terminos	noon	1½	
	8 0	3		Triangles - -		1½	
ar Cay -	8 10	4		Arcas Rocks - -	noon	1½	
	8 30	3		Vera Cruz - -		2	
lock -	7 50	3		<i>United States.</i>			
	7 0	4½		<i>(Texas, Louisiana, Mississippi, Florida, Georgia, and S. &amp; N. Carolina.)</i>			
la Plata, ingo - }	7 30	3?		Brazos R. (entr.)†	irr.	1½	
Bay -	7 0	4-5?		St. Luis Pass, Texas†		1½	¾
hin -	7 0	5½	3½	Galveston - -		1½	¾
ti, St. }	6 0	3		Sabine Pass† -		1½	
o - }	6 0	3		Calcasieu River†		2½	1½
rb. " -	6 0?	3?		Vermilion Bay }		2½	1½
Bay " -	8 0?	1?		(entrance)† - }	irr.	2½	
Mark " -	8 0?	1?		Atchafalaya Bay†	irr.	2-2½	
ince " -	8 0?	1?		Timballier Bay†	irr.	2	
" " -	8 0?	1?		Barataria Bay }		1½	
Cayes,, uncertain	2-3?			(entrance)† }	irr.	1½	
ay " -	"	2-3?		Mississippi S.W. pass		1½	¾
ay " -	"	2-3?		Biloxi† - -	irr.	2	
" " -	"	2-3?		Mobile - -	irr.	1-2	
" " -	"	2-3?		Pensacola - -		1½	
uba* -	8 14	3		St. Andrews Bay†	irr.	1-2	
radero,,*	8 39	2		St. Georges Sound }		2½-4	
" " -	7 23	2½		(west entrance)† }	irr.	2½-4	
Mata,,*	6 49	2½		(middle entr.)† }	1 31	1½	1½
Cuba,,*	8 33	2½		Apalachicola Bay -		2½-4	
ncia,,*	7 31	2½		St. Marks† - -	1 14	3	2½
Baiti- }	9 7	2½		Cedar Cays† - -	0 51	3½	2½
" " -	7 56	2½		Tampa Bay† - -	11 21	1½	1½
faravi,,*	8 49	2½		Tortugas† - -	9 56	1½	1
facó " -		1½		Cay West† - -	9 30	1½	1½
ntonio,, }	11 0	1		Cay West, N.W. }		1½	1½
al, Ja- }				Channel† - - }	9 10	1½	1½

\* From the Annario de la Direccion de Hidrografia, Madrid, 1863.  
United States Coast Survey, the times of High Water being the Corrected and not the Vulgar Establishment.



Place.	High Water Full and Change.	Rise.		Place.	High Water Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
(New Jersey.)							
Sand Cay* -	h. m. 8 40	ft. 2	ft. 1	Cape May Landing*	h. m. 8 19	ft. 6	ft. 5
Indian Cay* -	8 23	2½	1¾	Cold Spring Inlet*	7 32	5½	4½
Cape Florida* -	8 34	1½	1½	Little Egg Harbour	7 10	4½	3½
St. Augustine* -	8 21	5	4	(Long Island Sound.)			
St. Johns River*	7 28	5½	5	Watch Hill* -	9 0	3	2½
Fort Clinch, Fernandina* }	7 53	6½	6½	Stonington* -	9 7	3½	3
St. Simons Island*	7 43	8½	6¾	Little Gull Island*	9 38	3	2½
Doboy Lighthouse*	7 33	7¾	7	New London* -	9 28	3	2½
Savannah (City)* -	8 13	7½	6½	New Haven* -	11 16	6½	5½
Fort Pulaski, Savannah (entr.)* }	7 20	8	7	Bridgeport* -	11 11	8	6½
Hilton Head* -	7 19	7½	6½	Sheffield Island* -	10 58	8½	7½
St. Helena Sound*	7 8	7½	6	Oyster Bay* -	11 7	9½	8
North Edisto R.* -	7 10	7	5½	Sands Point* -	11 13	9	7½
Charleston* -	7 26	6	5	New Rochelle* -	11 22	8½	7½
Bulls Island Bay -	7 16	5½	4½	Throgs Point* -	11 20	9½	7½
Georgetown* -	8 40	4½	3½	(New York to Portland.)			
— South Island* - }	7 56	4½	3½	Tarrytown* -	9 57	4	3½
Wilmington* -	9 6	3	2½	New York* -	8 13	5½	4½
Cape Fear River (Smithville)* - }	7 19	5½	4½	Sandy Hook* -	7 29	5½	5
Bald Head* -	7 26	5	4½	Hell Gate Approaches* :			
Beaufort* -	7 26	3½	2½	— Long Island (Blackwells Dk.)* }	9 59	6	5½
Ocracoke Inlet* -	7 4	2½	2	— — N. of Astoria Ferry* - }	9 48	6½	5½
Hatteras Inlet* -	7 4	2½	2	— — Pot Cove, (S.E. part)* - }	10 48	8½	6½
(Chesapeake Bay and Rivers.)				— Wards Island (Paupers Dock)* }	10 9	6½	5
Cape Henry -	7 40	4		Montauk Point* -	8 20	2½	2
Cape Charles -	7 45	5		Block Island* -	7 36	3½	2½
Old Point Comfort*	8 17	3	2½	Point Judith* -	7 32	3½	3½
James R., City Point*	2 11	3	2½	Newport* -	7 45	4½	4
Richmond* -	4 28	3½	2½	New Bedford, entrance* }	7 57	4½	4
York R. (Moody's Wharf) }	9 35	3½		Bird Island Light*	7 59	5½	4½
Piankatank River (Cherry Point)* }	10 5	2	¾	Kettle Cove* -	7 48	5	4½
Tappahannock* -	0 42	2	1½	Cuttyhunk* -	7 40	4½	3½
Rappahannock (Saunders Wharf) }	3 2	2½	2	Quicks Hole (S. Side)* }	7 36	3½	3
Point Lookout* -	12 58	2	1½	" (N. Side)* }	7 31	4½	3½
Annapolis* -	4 38	1	1	Menemsha Bight*	7 45	4	2½
Chester R. (Rock-hall Creek)* - }	5 23	2½	1	Woods Hole (entr. from Vineyard Sound)* }	8 34	2	1½
Patapsco River (Bodkin Point)* }	5 42	1½	1	— (entrance from Buzzard Bay)* }	7 59	4½	4
Baltimore* -	6 33	1½	1½	Tarpaulin Cove* -	8 4	2½	2½
(Delaware Bay and River.)				Gay Head -	7 37	7	
Cape Henlopen -	8 0	4½		Holmes Hole* -	11 43	1½	1½
Delaware Breakwater* - }	8 0	4½	3½	Edgartown* -	12 16	2½	2
Higbees, Cape May*	8 33	6½	5½	Hyannis* -	12 22	4	3
Egg Island Light*	9 4	7	5½	Nantucket* -	12 24	3½	3
Mahons River* -	9 52	7	5½	St. George Shoals	10 30	7	
New Castle* -	11 53	7	6½	Monomoy* -	11 58	5½	4
Philadelphia* -	1 18	6½	5½				

\* From the United States Coast Survey, the times of High Water being the Corrected and not the Vulgar Establishment.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
etown* -	11 22	10 $\frac{3}{4}$	9 $\frac{1}{2}$	Lepreau -	11 18	24 $\frac{1}{2}$	21
et* -	11 5	13 $\frac{1}{4}$	12	L'Etang Harbour -	11 19	23 $\frac{1}{2}$	20
od -	11 30	13		Campobello	11 21	23 $\frac{1}{2}$	20
ible -	11 22	10	8 $\frac{1}{2}$	(Welchpool) -			
th* -	11 19	11 $\frac{1}{2}$	10 $\frac{1}{2}$	St. John Harbour	11 21	27	23
Light* -	11 12	11	9 $\frac{1}{2}$	Quaco -	11 35	30	25
(Charles- aval Yd.)*	11 27	11 $\frac{1}{4}$	10	Spicers Cove (near Cape Chignecto)	11 35	37	30 $\frac{1}{2}$
head -	11 30	12		Grindstone Island -	11 47	41	34 $\frac{1}{2}$
ster Harbour*	11 4	10 $\frac{3}{4}$	8 $\frac{3}{4}$	Folly Point	11 49	45	38
rt* -	10 57	10 $\frac{1}{2}$	8	(mouth of Petit- coudiac River -			
nam* -	11 0	10 $\frac{1}{2}$	9	Cumberland Basin,	11 55	45 $\frac{1}{2}$	38
* -	11 26	10 $\frac{1}{2}$	8 $\frac{1}{2}$	(Sackville -			
ryport* -	11 23	9	7 $\frac{1}{2}$	Monckton (Railway)	12 15	47	37 $\frac{1}{2}$
outh* -	11 23	10	8 $\frac{1}{2}$				
d* -	11 25	10	8 $\frac{1}{2}$				
ec River				<i>Nova Scotia.</i>			
niwells	11 15	9 $\frac{1}{2}$	8	Negro Harbour -	8 12	7	5 $\frac{3}{4}$
)*				Shelburne -	8 4	7	5 $\frac{1}{2}$
Desert Id. -	11 10	13		Rugged Island -	7 59	7 $\frac{1}{2}$	6
<i>Bay of Fundy, Nova Scotia.</i>				Port Mouton -	7 54	7 $\frac{1}{2}$	5 $\frac{3}{4}$
able, Bar-	8 27	8 $\frac{1}{2}$	6 $\frac{1}{2}$	Liverpool Bay -	7 50	8	5
on Bay,				Port Metway -	7 50	8	5
a Point) -				Cape le Have	7 48	7	5 $\frac{3}{4}$
le, Clarkes	8 58	11	9	(Spectacle Id.)			
our -	9 25	12	10	Le Have, Crooked	7 51	7 $\frac{1}{4}$	6
(Jones	9 27	12 $\frac{3}{4}$	10 $\frac{1}{2}$	Channel			
orage) -	9 49	12 $\frac{3}{4}$	10 $\frac{1}{4}$	„ Mothers Island	7 51	7	5 $\frac{3}{4}$
and (Cape	9 54	13	10 $\frac{1}{2}$	„ Getsons Cove	7 55	7 $\frac{1}{4}$	6
) -	10 4	15	11 $\frac{3}{4}$	„ Bridgewater,	8 6	8	6 $\frac{1}{2}$
ods An-	10 9	16	13	McKean's Wharf			
ge -	10 33	21 $\frac{1}{2}$	17 $\frac{3}{4}$	„ Lunenburg	7 54	7 $\frac{1}{4}$	6
-	10 41	22	18	(Spidlers Cove)			
th -	10 43	20 $\frac{3}{4}$	17	Sable Island, N. side	7 30	4	
Cove E.,	10 47	23	19	„ S. side	6 30	4	
arys Bay	11 0	27 $\frac{1}{2}$	23	Halifax Harbour -	7 49	6	5
assage -	11 17	32	28	Jedore Harbour -	7 45	6 $\frac{1}{2}$	4 $\frac{3}{4}$
Passage -	11 21	33	28 $\frac{1}{2}$	Ship Harbour -	7 54	6 $\frac{1}{2}$	4 $\frac{1}{2}$
Cove, West	11 29	36	31	Sheet Harbour -	8 6	6 $\frac{1}{2}$	4 $\frac{1}{2}$
ut -	11 42	39	33	Liscomb Harbour -	8 0	6 $\frac{1}{2}$	4 $\frac{1}{2}$
orge -	12 17	43	37 $\frac{1}{2}$	Beaver Harbour	7 40	6 $\frac{1}{2}$	4 $\frac{1}{2}$
ute -	12 30	48	40	Whitehaven -	8 0	6 $\frac{1}{2}$	4 $\frac{1}{2}$
lock -	12 41	50 $\frac{1}{2}$	43 $\frac{1}{2}$	Canso Harbour -	7 48	6 $\frac{1}{2}$	4 $\frac{1}{2}$
s Anchorage				Crow Harbour -	8 0	6 $\frac{1}{2}$	4 $\frac{1}{2}$
o, Basin				Guysborough -	8 20	6 $\frac{1}{2}$	4 $\frac{1}{2}$
of Mines				Pomquet -	9 15	4	2 $\frac{1}{2}$
Bluff „ -				Cape George -	9 15	4	2
„ -				Merigomish -	10 6	5 $\frac{1}{4}$	3 $\frac{1}{4}$
<i>Bay of Fundy, New Brunswick.</i>				Pictou Harbour -	10 0	6	4
ve, Grand	10 54	20	15	Caribou Harbour -	10 0	6	4
n -	11 5	18	14 $\frac{3}{4}$	Amet Sound -	10 30	8	5
, Seal Isd.	11 7	21	17 $\frac{1}{2}$	Tatamagouche -	10 0	8	5
Harbour,	11 12	21	17	Wallace Harbour -	10 30	8	5
l Manan -	11 16	22 $\frac{1}{2}$	18 $\frac{1}{2}$	Pugwash Harbour	10 30	7	4
oddy -				Bay Verte -	10 0	9	5
ad, Grand							
n -				<i>New Brunswick.</i>			
				Jourimain Island -	9 30	6	3
				Shediac Harbour -	{ 1 0 }	4	2
					{ 8 0 }		

the United States Coast Survey, the time of High Water being the Corrected and not the Vulgar Establishment.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Prince Edward Island.							
	h. m.	ft.	ft.	Anticosti Island } (East Cape) -	h. m.	ft.	ft.
East Point -	8 30	3½	2	" Bear Bay -	1 0	5	3
Cardigan Bay -	8 40	5	3½	" West Point -	1 10	5	3
Cape Bear -	9 0	6	3	" West Point -	2 0	6	4
Charlottetown -	10 45	9½	7	Cawee Islands -	1 50	9	5
Crapaud -	10 0	8	6	Egg Island -	2 0	11	6
Bedeque Harbour -	10 15	7	5	Point de Monts -	12 0	12	6
Minimegash -	3 30	5	3	Cape Chatte -	12 0	13	8
Egmont Bay -	3 0	4	2	Godbout River -	1 52	11	6
Cascumpeque Hr. -	5 40	3	2	St. Nicholas Harb. -	1 55	12	7
Richmond Harb. -	6 0	3	2	Manicouagon River -	2 15	12	7
Cape Turner -	6 10	4	2	Bersimis River -	2 0	12	7
Grand Rustico -	6 40	4	2	Bic Island -	2 15	14	8½
Tracadie -	7 0	3½	2	Port Neuf -	2 10	13	8
St. Peter Harbour -	8 30	4	2½	Matan River -	2 15	11	7
Boughton Harb. -	8 40	5	2½	Little Metis -	2 10	13	8
				Saguenay, Tadousac -	2 45	17	10
				" Chicoutimi -	4 11	12	8
Cape Breton Island.				River St. Lawrence.			
Port Hood -	9 0	4½	2	Green Island -	2 45	16	9½
Gut of Canso } (Plaister Cove) -	9 15	4	2	Brandy Pots -	3 0	17	10
Mabou River -	9 0	4		Coudres Island } (Prairie Bay) -	4 25	17	10
Chetican -	8 15	3½		Pillars -	5 0	17	10
Cape North -	8 0	4		Crane Island, } Middle Traverse -	5 24	17	13
St. Anne Bay -	8 34	6	4½	Orleans Island, } North Traverse -	5 40	17	13
Sydney Harbour -	8 15	5	4	Quebec -	6 38	18	13
Menadou Bay -	8 15	5½		Carouge River -	7 15	16	11
Louisburg Harb. -	8 0	5	4	Frechette Island -	8 0	14	9
St. Peter Bay -	7 30	6	4	Port Neuf -	8 30	14	9
Habitants Harbour -	8 20	6½	4½	Grondine -	9 0	9	6
Arichat -	8 10	5	4	Cape Roche -	9 30	6	4
Bear Head -	8 30	4½	3	Champlain -	9 45	3	2
Poulament Bay, } Madame Island -	7 50	6	4	Batiscan -	9 48	3½	2
Grande-digue, " -	7 55	6½	4½	Antigonish Harb. -	9 0	4	2
				Three Rivers -	11 30	1	
Labrador and Gulf St. Lawrence.				Gulf St. Lawrence.			
St. Lewis Cape -	6 30			St. Paul Id. -	8 0	5	3
Fall Harbour } (Telegraph Pt.) -	6 40	3½		Magdalen Islands -	8 20	3	2
Chateau Bay -	7 35	3½	1	Gaspé Basin -	2 40	5	3
Red Bay -	7 45	3½	1½	Point Macquereau -	2 0	5	3
Bradore Bay -	8 45	4	2	Carleton Point -	3 0	6	4
Belles Amour Bay -	9 0	4½	2½	Dalhousie Harb. -	3 10	9	
Bonne Esperance } Harb. -	9 15	5	2½	Campbell Town, } Ristegouche R. -	4 0	10	7
Mistanoque -	10 30	6	3	Bathurst -	3 15	7	4
Antrobus Island -	10 30	5	3	Shippigan -	3 42	5½	3
Wapitagan Harbour -	10 30	5	3	Caraquette Harbour -	2 40	6	3
Coacocho Bay -	10 30	5	3	Miscou -	2 30	5	3
Kegashka Bay -	10 45	5	3	Miramichi Bar -	5 30	5	3
Little Natashquan -	11 0	5	3	Sheldrake Island -	6 0	5	3
Appetetat Bay -	11 10	5?	3?	Vin Harbour -	5 45	5	3
Betcheween Har- } bour -	11 32	5	3	Beaubère Island -	6 30	6	4
Clearwater Point -	11 30	5	3	Point Escumenac -	4 10	4	2½
Mingan Harbour -	1 16	6	4	Richibucto River -	3 30	4	2½
Mingan Island -	1 30	6	4	Buctouche River -	7 0?	4?	2?
Bay of Seven Is- } lands -	1 40	9	5	Cocagne River -	7 30?	4?	2?

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Newfoundland.</i>				<i>Barrow Strait.</i>			
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>		<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
re -	8 33	6½	4½	Port Leopold -	12 6	6	4½
Harbour -	9 15	8½		Erebus Bay -	12 6	8	
nd Little -	8 15	7	4	Griffith Island -	12 15	3½	2½
St. Law- Harbour -	8 30	7	4	<i>Melville Island.</i>			
Harbour -	8 45	6½	4½	Winter Harbour -	1 30		
y Harbour -	7 40	7½	5	<i>Banks Land.</i>			
Harbour -	8 0	7½	5	Bay of Mercy -		2	
. Mary -	8 30	7	5	Prince of Wales -		3	
a -	8 30	7	5	Straits -			
y Harbour	7 0	6½	5	<i>Africa, South Coast.</i>			
ice -	7 0	6½	5	Simons Bay -	2 44	5½	3½
us -	7 30	6	4	Dyer Island -	2 50	5	
r Grace -	7 30?	7?		Cape Agulhas -	2 50	5	
Trinity Bay -	7 22	3½	2	Mossel Bay -	3 30	6	
Harbour -	7 0	6	4	Nysna Harbour -	3 45	5	
Harbour -	7 10?	5?		Plettenberg Bay -	3 10	6	
land -	7 20	4		Flesh Bay or Bay -	3 30?	6?	
land -	7 0?	2-3?		St. Bras -			
Harbour -	7 0?	2-4?		Algoa Bay -	4 0	4-5	
Harbour -	7 0?	2-4?		Bird Islands -	4 0	4-5	
e Lis Harb.	7 15	2-4		Waterloo Bay -	4 0	6	
Harbour -	7 0?	2-4?		Buffalo River (en-	3 45	4½	
urbour -	6 30?	4?		trance) -			
nHarbour {	7 21 A.M.	4½	3	St. John River -	4 0	5	
ove -	6 30 P.M.			Port Natal -	4 30	6	
Harbour -	7 0?	2-3?		Delagoa Bay, Eng-			
Bay -	7 0?	2-3?		lish River (Por-	5 20	12	
Bays -	7 0?	2-3?		tuguese Factory)			
3., (N. Cst.)	7 23	2½		" (Port Melville)	4 30	15	
rb. (N. Cst.)	7 25	3?		" Shefeen Island	4 40	12	
. Choix, -	10 47	5		<i>Africa, East Coast.</i>			
. Coast) -				Inhambane River -	4 15	10	
rt, Bay of -	10 42	5½		Cape Bazaruto -	4 15	10	
Island -	9 15	6	4	Sofala River -	4 0	19	
sque -	8 55	5½	3½	Quilimane River	4 15	16	
e Bay -	9 0	6	4	(entrance) -			
<i>Hudson Strait.</i>				Zambezi River	4 30	12-15	
Islands -	6 50			(Pearl Island)			
nd Hecla -				Luabo River (entr.)		22	
, Melville	7 0	8		Angoxa River -		13	
sula -				Mozambique Har-	4 15	12	
<i>Hudson Bay.</i>				bour -			
ictory -	11 15	10-14		Pomba Bay -	4 0	15	11
<i>Arctic Regions, Greenland, West Coast.</i>				Oibo Harbour -	4 15	6	
saab -	5 6	7	5	Mahato Island -	4 30	7	
kshaab -	6 3	12½	9½	Cape Delgado -	4 0	16	11½
borg -	6 30	10		Rovuma River -	4 0	16	11½
ik -	11 0	8		Pimlea Harbour -	4 30	12	
holm -	11 8	7½		Mungullo or	4 45	12	
-				Mongallo River			
				Lindy River (en-	4 15	12	
				trance) -			



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Kheī meh -	11 45	7		Rajahpoo Harbour	11 0	12	
a' -	8 30?	6?		Bancoot River			
n -	5 30	7		(entrance) -	2 0	12	
Arabi -	6 30?			Geriah Harbour -	2 40	9	
Kabr -		8½		Angria Bank -	10 30	9	
-	0 15	9		Dewghur Harbour	11 25	9	
(Bar)	12 0			Goa -	11 30	6	
Kharg or				Sedaashigur Bay* -	10 0		
reg -	8 0	6½		Agoda Point -	10 30	9	
sehr -	7 30	7		Merjee River -	11 0	7	
en Nakhei-	7 30?	8?		Calicut Roads -	0 15	5	
-				Beypoor River (en-	0 15	5	
-	5 0?			trance) -			
Kais -	0 45	7½		Cochin Harbour			
Tumb -		8		and Road -	1 0	3½	
-	12 0?						
h -	12 0	10					
-	11 0	12					
Lárek -	10 15						
Town -	6 0?	9					
Shoal, } ochistan - }	9 30	8					
<i>Hindoostan, West Coast.</i>				<i>Ceylon, South Coast.</i>			
a Point (en-				Colombo -	1 0	2	
eto Karachi	10 30	9½	6	Dodandowe Bay -	1 50	1½	
our) -				Pointe de Galle -	2 0	2	
Bunder } th of Indus)	9 50	7		Belligam or Red Bay	2 20	2½	
r " -	10 5	9		Kirindi -	3 30		
arry " -	10 10	8		Batticalao River -	5 0	2-3	
r River (en-	9 57	9		Trincomalie Har-			
ce) -	10 30	11		bour -	8 18	2	1½
River (Mon-				Palmeira Point -	9 30	7-11	
point) -	11 40	11					
Gulf of Cutch	12 20	12	8				
" -	2 0	16	12½				
a " Creek							
rance) -	11 0	9					
vee Roads -	11 50	15	11				
at -	11 35	9	7½				
r (entrance,	2 15	18	13½				
of Cambay)							
land -	2 0	6					
-	4 0	19					
m (Bar) -	1 30	17					
ah -	0 15	16					
ree River, }	3 0	18					
) -							
vee River	2 0	19					
rance) -							
r R. (entr.)	1 45	18					
ary River -	1 45	18					
River " -	1 30	17					
ah River -	1 30	16					
y Dockyard	11 40	12-17					
				<i>Bay of Bengal, West Coast.</i>			
				Tuticorin Har-			
				bour and Road,	1 15	2½	1½
				(Gulf of Manar)			
				Keelucarry -	11 0		
				Paumben Pass -	1 30	2	
				Kitnspatnam (West			
				side of Palk	11 0	1½	
				Straight) -			
				Negapatam -	5 0	3	
				Nagore -	8 15		
				Madras Road -	7 34	3½	
				Pulicat Shoals -	9 25	2½	
				False Point -	8 0	8	
				Point Divy -		5	
				Coringa or Coca-			
				nada Bay }	9 10	4-5	3
				" River (Bar)	9 0	5	
				Balasore River -	10 0	15	
				Kedgerie -	11 30		
				Saugor Island -		12	
				Western light ves-			
				sel (entrance to	10 0	10½	
				Hoogly) -			
				Mutlah River,			
				Western or	9 0	10	
				Ward's Channel			
				" (entrance to			
				Biddah River) }	10 0	14	
				" (Muda Kali)	11 45	15	
				Calcutta -	2 30		

ng tides rise, a.m. 6 feet, p.m. 7½ feet from October to March ; and the contrary during the rest  
ar.



Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.
<i>Malacca Strait, Sumatra Coast.</i>			
	h. m.	ft.	ft.
Point -	12 0	9½	
ver (en- } -	9 0	12	
he town -		11	
<i>Timor, East End.</i>			
- -	11 0	9	6½
<i>Sumba or Sandelhout, North Coast.</i>			
ssie Har- } -	11 30	17	13½
Road -		15	
<i>Sumbawa.</i>			
land -	8 10	3	
y -	1 0	10	
i Bay -	1 0	11-12	
y -	Noon	6	
<i>Lombok, West Coast.</i>			
n Bay -	8 0	6	
ly -		10-12	
<i>Baly.</i>			
Bay } -	11 0	9½	
Coast) -			
Road } -	5 0	6½	
Coast) -			
<i>Java.</i>			
Bay -		7-8	
Harb. } -	8 45	3½	
Coast) -			
s Bay } -	5 0	5½	4
Coast) -			
- -		5	
- -	10 0	2	
- -	7 0	4	
<i>Sumatra, N.E. Coast.</i>			
- -		5	
- -	6 0	6	
Linga } -	6 0 P.M.	12	
er -	4 0	8	
<i>Sumatra, West Coast.</i>			
- -	6 0	3-5	
iver (Bar) -	6 0	4½	
Island -	6 0	4	
nd) -			
ly Har- } -	6 10	6	
- -			
ead -	8 45	8	
<i>Durian Strait.</i>			
	h. m.	ft.	ft.
Sabon Island -		10	
Deep Point -	5 0	10	
Red Island -	5 0	10½	
<i>Banka Strait.</i>			
Toboe Ali Point -	{ 8 30 P.M.† 10 0 A.M.† }	12	
Lucipara Pass -	irr.	10	7½
Nangka Island -	7 0	9½	
Cape Oelar -	6 30	12	
Bersiap Point -	6 30	12	
Kalian Point -	8 17½	15½	
Lobah Point -	11 0†	10	
<i>Gaspar Strait.</i>			
Pulo Mendanao -	2 30	4	
Pulo Leat -	2 30	4	
<i>Java Sea.</i>			
Crimon Islands -	8 0	6	5
<i>Celebes.</i>			
Macassar -	4 40	5½	
<i>Flores Sea.</i>			
Adenara, Flores -		8	
<i>Moluccas.</i>			
Batchian, Gilolo -	1 0	6	
Sanguir Island -		6	
Gèby, Fohou Island -		5	
Wahaay Harbour, } -	6 0	3	
Ceram -			
Bouro, Cajeli Bay -	1 0	6	
Amboyna -	0 32	7	
Saparocoo Island -		6	
Cambing or Pas- } -	noon	6	
sage Island -			
Banda, Banda Islands -	4 0	6 ?	
Dampier Strait -		11	
<i>Filipinas.</i>			
Port Zebú -	12 0	7	
Port Buluagan -	12 0	5½	
O'sta Ana -	12 0	5½	
Port Iliolo -	12 0	5½	
Port San Jacinto, } -	6 30	6	
Ticao Island -			
Mindanao -	7 0	6	
Manila (Luzon) -	10 40	2½	
Port Sual -		6	
Port Laguimanoc -	1 30	5½	
Alabat Harbour -	10 0	9	
Paloan Bay (Min- } -		5	
doro) -			
Busuanga (Burias Id.) -	12 30	6	

observations made in the month of September by W. Stanton, Master commanding H.M. Surveying Brig, Saracen.

† In S.E. Monsoon.

‡ In N.W. Monsoon.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Loo Choo Islands.							
Nafa-Kiang -	h. m. 6 28	ft. 7	ft.	Ursula Island } (Palawan, East Coast) -	h. m. 11 0	ft. 7½	ft.
Port Oonting -	6 35	8		Port Royalist -	11 0?	6½?	
Oho Sima, Vincennes Bay -	7 30	5½		Millman Island } (Palawan, West Coast) -	10 27	2½	
Bonin Islands.							
Port Lloyd, Peel Island -	6 8	3		Casuarina Point, -	9 30	6½	
New Port, Hillsborough Id. -	11 32	3½		Barren Island -	9 30	5½	
China Sea, East Coast.							
St. Pierre, Island -		4		Bird Island -	9 30	6	
Rendezvous Island, Borneo, S.W. Coast -		8		Tai-Tai Bay -	9 30	5½	
Tanjong Api -		7		Batanes, Bashee Islands -		4	
Sarawak River (Moratabas entrance) -	4 0	9	5½	Port Kok-si-kon (Formosa, East Coast) -	11 30	3	
" Santubong -	4 0	10	6	Tam-Sui Harbour -	11 45	7-12	
" Sarawak Junction -	5 0	15-18	9	Kelung Harbour (Formosa, N. Coast) -	10 30	3	
" City -	5 20	15-18	9	Sau-o Bay -	10 0	3½	
Burong Island -	4 45	7		Babuyan Islands.			
Rajang River -	4 45	13	9	Port Pio Quinto, Camiguin Island -	6 0	6	
Bruit River -	3 0	11		Port Musa, Fuga or New Babuyan -		5	
Bintula River -	5 45	6		China Sea, West Coast.			
Labuan Island -	9 45	6		Romania Point, (Malay Peninsula, E. Coast) -	10 30		
Mungahum Island -	11 0	5		Sedili River (entrance) -	9 44	7	
Bruni River -	11 0	12		Blair Harbour -	8 50	9	
Dalawan Bay (Balabac Island) -	11 0	5		Pulo Timoan (West side) -	6 0	7½	
Malludu Bay, Borneo N. Coast -	10 30	6-8		Binkang Bay (Cochin China) -	11 30	5	
Balambangan Id. -	10 0	6-8?		Tringano River (Gulf of Siam, West Coast) -	8 0	7	
Unsang (Borneo, N.E. Coast) -	8 0	3½		Menam River, Paknam -	5 7	9½	
Ragged Point, Borneo, E. Coast -		7		Cape Liant (Gulf of Siam, E. Coast) -	5 7	11	
Famarung Islands (Borneo East Coast) -		8-10		Chentabun River (entrance) -	10 0	5½	
Eran Bay (Palawan, West Coast) -	10 10	6½		Rocky Island (Gulf of Siam, E. Coast) -	4 0	4	
Tay-bay-oo-bay -	10 15	6		Pulo Panjang -	7 0	2	
Ooloogan Bay -	9 30	5½		Pulo Condore (Cochin China)* -	2 30	6½	
Mayday Bay -	9 55	3½		Saigon, Cochin China, Cape St. James -	11 0	8	
Port Barton (Bubon Point) -	10 55	6		" Saigon City -	5 30	9½	
Pancol -	9 40	6					
Bacuit Bay -	10 0	6					
Cavern Island -	9 30	5½					
Observatory Island -	11 0	5½					

\* From a French Survey, 1862.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full, and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
g Bay				Amoy, Inner Harb.	12 0	18½	14½
in China, east	8 30	5½		Hu-i-tau Bay	12 15	16	
ie Bay "	11 30	5		Chimmo Bay	10 20	16	
ay "	3 0	4		Chincnu Harbour	12 25	17	
Bay				Meichen Sound	12 30	17	
an Island,		4-5		Hai Tau Strait	12 15?	16?	
k Harbour	12 0	8½		White Dog Ids.	9 0	18	
a, E. Coast	4 0	5		Min River, Tem-	10 45	19	14½
hoal	10 0	8		ple Point	12 0		
River	11 0	7½		Min R., Losing Id.	9 30	17	
nce)	10 0	7		Chang-chi Island	10 0	17	
ay River	11 0	7½		Spider Island	10 15	16	
nce)	10 0	6½		Lishan Bay	10 0	17	
nchorage	10 0	6½		Namquan Harbour	8 30	17	
munHar-	12 6	6½		Namki Islands	8 30	17	
Canton R.	11 50	6½		Pih-ki-shan Ids.	8 30	17	
eet entr. "	1 30	6½		Fong-whang-			
Channel "	11 20	6½		group, Bullock	8 30	17	
Id. "	12 0	7½	5	Harbour			
d. "	1 0	7½		Wan-chuRiver(ent.)	9 0	15½	
kChannel "	2 0	7½		" City	9 30	15½	
ee Point "	1 40	7½		Towan Island	9 20	13	
Mar. -	1 15	7-8		Tai-chow Islands	9 0	14	
April -				St. George Id.	10 20	15	
May &	0 30			San-moon Bay	9 30	14	
June -	2 40	5½		Kweshan Islands	10 30	20	
Mar. -	1 40	5½		Nimrod Sound	9 40	14	
May &				Vernon Channel,			
June -				Chusan Archi-			
SiKiang		5-6		pelago	11 0	12	9
est River.		3		Ting-hae Harbour	8 15	12	
ng "		1-1½		Poo-too Island	10 0	13	
ong Road-	10 15	4½		Lansew Bay	11 30	15	
Group	10 0	5		Volcano Islands	11 0	14	
ve, Mira Bay	10 0	6½		East Saddle Island	11 20	12½	
ng Id. Bias	8 0			Yung River, Chinhae			
how Id.	8 30			" Ning-	1 0	9	
Bay	10 0	6½		po-fu			
ai Bay	7 0			Hang-chu Bay,	11 45	14	
ng Point,	8 0			Sesham Ids.	11 45	17	
echin Bay	9 0	7?		" Fog	12 0	25	
Point	11 15	7		Islands			
n Bay	11 0	6½		" Chapu			
Good Hope	11 30	12		Road			
Road, Na-	11 30	12		Hang-chu Bay		32	
Id.	10 30	9½	7	(off Can-pu)			
Bay				Gutzlaff Island	11 30	15	
ng Harbour				Yang-tse Kiang	12 0	15	10
y Id. Rees				(entrance)			
Harbour				" entrance	0 30	15	10½
adores)				to Wusung	0 35	13	8
				River	0 40	10	7
				Pheasant Point,	1 40	12	8
				Wusung River			
				Shanghai			
				Langshan Crossing			

amboa Docks—In March, the day and night tides rise to the same level. From April to October day tides are the higher, and from November to February the lower. In May and June the level, rising tides is 4 feet, and the neaps 2 feet higher than in March. Langshan Crossing the tide rises for 3 hours only, and falls for 9 hours.—H.M.S. Actæon, 1861.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Yellow Sea.</i>				<i>Japan Sea.</i>			
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>	Korea, S. Coast, }	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
Wang-kia-tai Bay	6 0	12	9	Tracy Island - }	8 58	11½	8½
Ching-tau Bay	6 0	12	9	" Hooper Id. - }	9 10	11½	8½
Lo-shan-kan	4 30	11	9	" Port Hamilton	8 30	11	
Staunton Island	1 30	8	5½				
Wang-kia Bay	2 30	9	7				
Shihtau Bay	1 30	9	7				
Sang-tau Bay	0 55	7	4½				
Aylen Bay	2 30	6	4				
Litau Bay	3 0	6	4				
Wei-hai-wei Har- }	9 30	9					
bour							
Lung-mun Harbour	10 0	7					
Chifu	10 34	8	6½				
Hope Sound (Mi- }	10 24	6½					
au-tau Group)							
Miau-tau (Depôt }	10 35	6					
Bay)							
Ta-tsing ho	4 10	10½	8				
Peiho or Peking }	3 40	10	7½				
River (entr.)*							
Tien-tsin, Peiho }	7 0	4½					
River							
Peh-tang ho	3 33	10	7½				
Sha-lui-tien Banks }	2 50	10	8				
(west part)							
Liau-tung, Ching }	1 20	6½					
ho							
Lau-mu ho	1 30	5					
Tai-cho ho	0 15	6					
Yang ho	0 15	6					
Ning-hai	12 0	6					
Sand Point, Gulf }	4 50	7	5½				
of Liau-tung)							
N.W. Head of Gulf }	5 30	10	8½				
of Liau-tung							
Liau Ho (Bar)	4 0	11½	7½				
" (entrance)	5 0	12					
Vansittarts Saddle	4 20	10	8½				
Hulu Shan Bay	2 30	8	6				
Society Bay, Suli- }	0 15	8					
van Bay							
Port Adams, Mary }	2 0	10					
Island							
Pigeon Bay	11 45	8					
Ta-lien-whan Bay	10 47	10½	8				
Encounter Rock	10 44	11	8				
Haiyun-tau	9 30	12	8				
(Thornton Haven)							
Chodo Id., Korea, }	6 20	12					
W.C.)							
Basil Bay	4 15	18	10				
Marjoribanks "	3 30	29					
Harbour "	2 25	18	10				
Ko-kun-to Group "	9 28	11½	8½				
Korea, S. Coast, }	9 50	11½	8½				
Kuper Harb.							
" Crichton Harb.							

\* Time and rise much affected by winds.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Kamchatka.</i>							
Bay	h. m. 3 30	ft. 6½	ft. 4½	New Plymouth (Taranaki)	h. m. 9 30	ft. 12	ft. 9
<i>Zealand:—South or Stewart Island.</i>							
Bay	11 10	8	6	Kawhia Harbour	9 30	12	
Pe	12 0	7	5	Aotea Harbour	10 0	12	9½
Gasus	11 50	8	6	Waikato River	9 30	12	9
Venture	12 20	8	6	Manukau Harbour (entrance)	9 30	13	10
Is Inlet	1 10	8	6	Kaipara Harbour (entrance)	10 55	10	8
William	12 45	8	6	Hokianga River (entrance)	9 45	0	
<i>Middle Island, East and North Coasts.</i>							
Harbour	1 18	8	6	„ (Kokohu)	10 15	10	7
ix Bay	3 0	8	6	Cape Maria Van Diemen	8 0	7	
Harbour (ence)	2 50	7	5	Three Kings Islands	8 0	7	
Harbour	3 24	8	6	<i>North Island, East Coast.</i>			
oper	3 50	7½	5½	Cape Palliser	6 0	6	
Peninsula	5 30	8	6	Hawke Bay	7 50	3	
Campbell	6 0	8	6	Poverty Bay	6 5	6	
derwood	6 10	8	6	East Cape	8 55	7	
Charlotte (entrance)	8 50	8	6	Hicks Bay	9 0	7	
ore	9 0	8	6	Tauranga Harbour	7 10	6	4½
Sound (ence)	9 35	11	7	Mercury Bay	7 21	7	5
rdy	9 55	8	6	Gt. Barrier Island (Nagle Cove)	6 25	10	7
es Harbour	9 0	12	8	Auckland Harbour	7 5	11	9
	9 50	14	10	Kawau Island	6 30	10	7
e Bay. (an Corner)	8 45	13	9	Wangari Harbour	7 0	9	7
Motu Pipi				Tutukaka Harbour	7 0	9	7
, W. Ent.	9 50	14	10	Wangaruru Harbour	7 10	9	7
rewell	9 20	14	10	Bay of Islands, (Motu Mea Islet)	7 15	9	6
<i>Middle Island, South and West Coasts.</i>							
e Id. (Fo-St.)	1 0	8	6	Wangaroa Harbour	8 15	7	
Id. (Fo-St.)	12 15	8	6	Cavalli Islands	8 0	7	
ation Inlet	11 20	8	6	Monganui Harbour	8 15	9	7
Inlet	11 5	8	6	Awanni River	7 44	7	
Bay	11 15	10	8	Parenga-renga Harbour	7 54	7	
Sound	11 30	8	6	<i>Australia, East Coast.</i>			
on Sound	11 30	8	6	Twofold Bay	10 0	7	5
ound	10 45	8	6	Botany Bay	8 15	7-8	
Sound	9 15	8	6	Jervis Bay	6 20	6-9	
ui Inlet	11 20	7	6	Port Jackson, North Head	8 15		
<i>North Island, South and West Coasts.</i>							
holson, Harbour	4 30	5	3	Sydney	8 38	4½	4
land	7 0	8	6	Broken Bay	8 0	6-9	
land	9 0	6		Newcastle or Port Hunter	9 45	6-7	
tu River	10 0	8	6	Port Stephen	9 0	6	
ui River	10 15	8	6	Manning River	9 15	4	
				Crowdy Head	9 15	5	
				Port Macquarie	8 56	4-5	
				Shoal Bay	8 30		
				Richmond River	9 20		

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Cape Byron -	9 45	6		Possession Island -	1 0	9½	
Tweed River } (Danger Point) }	9 45	5 - 8		Darnley Island -	9 30	12	
Moreton Bay -	9 30	3 - 7		Bramble Cay -	9 15	12	
Wide Bay -	9 14	10	7	Murray Islands -	9 30	10	
Sandy Cape -	7 50	6 - 8		Adolphus Island -	12 15	10	
Port Curtis -	9 40	10 - 12		Albany Islands } (Port Albany) }	12 15	10	7
Byron Bay -	9 45	6					
Wreck Reef, } (Bird Islet) - }	8 3	6		<i>Australia, North Coast.</i>			
Cato Bank -	8 0	6		Endeavour Strait, } F. Entrance - }	1 0	9½	
Lady Elliot Islet -	9 0	7 - 8		Booby Island -	4 30	8	
Heron Islet, } Capricorn Group }	9 0	10		Albert River (Kangaroo Point) - }	7 30	10 - 13	
Keppel Bay -	9 30	9 - 14		Wellesley Isles -	7 30	8 - 12	
Great Barrier Reef	8 48	7		Sir E. Pellew Isds. -	7 30	4 - 7	
Saumarez Reef -	8 0	6		Investigator Road -	8 0	9	
Frederick Reef -	8 0	6		Arnhem Bay -	8 0	6 - 8	
Kenn Reef -	8 0	5½		Goulburn Isles -	6 0		
Middle Bellona Reefs	8 30	6		Alligator River -	8 40	19 - 20	
Avon Isles -	8 30	5		Shoal Bay -	6 0	18 - 25	14 - 20
Chesterfield Islet -	8 30	5		Port Essington -	3 24	13	
Mellish Reef (Sand Cay) - }	7 55	5 - 6		St. Asaph Bay -	5 45	14	
Thirsty Sound -	10 45	12 - 18		Swift Bay -	12 0	21	
Port Bowen -	9 35	16		Port Darwin -	5 30	17 - 24	
Shoal Water Bay -	10 30	12 - 18					
Broad Sound -	11 0	20 - 30		<i>Australia, North West Coast.</i>			
Swain Reefs -	10 25	10		Victoria River, } Turtle Point - }	7 15	15 - 24	
Percy Isles, Middle or No. 2 Island }	10 30	16	13	" Mosquito Flat	0 19	7 - 13	
(West Bay) - }				" Sandy Island	1 17	3 - 10	
" South or No. 1 Islet, }	10 30	14		Prince Frederick Harbour - }	12 0	28	
(N.W. Bay) - }				St. George Basin -	12 15	25	
West Hill -	10 20	24		Careening Bay -	11 45	30	
Cape Conway -	11 0	18		Admiralty Gulf -	12 0		
Goold Island -	6 45	6		Brunswick Bay -	12 0	24	
Port Denison -	9 30	6		Camden Harbour -	12 0	37½	
Upstart Bay -	9 0	6		Collier Bay -	11 45	36	
Cleveland Bay -	7 30	10 - 12		Sharks Bay, Naturaliste Channel }	11 45	6	
Dunk Island -	9 28	6 - 10		" Denham Sound	12 5	5	
Fitz-Roy Island -	9 15	7 - 12		" Freycinet Reach	3 0	5	
Endeavour River -	8 0	5 - 10		" Estuary	4 15	3½	
Trinity Opening, } Great Barrier Reefs - }	9 15	7 - 12		" Cape Perron -	12 45	5½	
Lizard Island -	9 15	7 - 10		" Hamelin Pool	5 0	3½	
Willis Islets -	8 0	6		Houtman Rocks -	11 30	2½	
Osprey Reef -	8 36	6		Champion Bay -	9 10	1	
Flinders Group -	9 15	8 - 12					
Cape Sidmouth -	9 15	10		<i>Australia, West Coast.</i>			
Cape York -	11 15	10	7	Cockburn Sound -	9 0	1 - 1½	
<i>Torres Strait.</i>				Warnboro' Sound -		3 - 4	
Sir Cs. Hardy Is. -	9 15	10		Koombanah Bay -	9 0	½ - 3	
Raine Island -	8 10	10		Port Grey, Swan River - }	9 0	1 - 1½	
Wallis Island -	Irreg.	7					
Cape Possession -	9 0	6					

	High Water, Full and Change.	Rise.		Place.	High Water, Full and Charge.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
<i>Australia, South Coast.</i>							
	h. m.	ft.	ft.	Tamar River, }	h. m.	ft.	ft.
-	11 40	8		(Launceston) - }	1 0	12½	
story	2 0	10		Eddystone Point -	9 39	7	
-	1 10	8	6	Georges Bay -	9 42	3	2
ance	1 30	3 - 4		Cape Pillar -	1 0	6	
cliff	1 30	3		Port Arthur -	7 52	4	
Bay	2 30	3 - 4		Hobarton -	8 15	4½	3½
Bay	3 0	3 - 4		Macquarie Harb. -	7 30	3	
-	1 20	3					
-		4					
ur -	2 50	2½		<i>Islands in South Pacific.</i>			
-		4		Easter Island -	2 0		
Midnight		4		Bow Island -	2 40	3	
-	3 0	5		Tabuai Id. -		3	
-	10 0	4		Tahiti or Otaheite Id. -	noon.	1½	
oals	3 30	5 - 6		Resolution Bay, }			
-	5 44	6		Sta. Christina, }	2 30	4	
by, }	4 10	6		Marquesas - }			
on, }				Fannings Id. -		4	
-	5 0	6		Tongatabu -	6 50	4	
				Port Resolution, }			
sage	12 0	6 - 8		Tanna Island - }	5 35	3	
-	5 45	4½		Port Aneiteum, }			
y -	7 0	6 - 8		Inyang - }	6 35	4	
ta* -	8 30	9 - 12		Banks Ids., Port }			
-	irr.	4 - 5		Patteson, Vanu }	6 40	5	
is -	1 50	3		Lava Id. - }			
-	10 30	6		" Port Sandwich, }	5 30	4	
le, }	12 0	6		Malicolo Id. - }			
-				" Vita Harbour, }	5 0	5	
-	1 0	5		Sandwich Id. - }			
-	12 15	6		" Havannah }			
-	12 15	6		Harb. Sand- }	7 15	4	
-	10 30	6		wich Id. - }			
r -	2 15	6		" Dillon Bay, Er- }	5 30	4	
we -	9 0	6		romango Id. - }			
yal }	11 56	1 - 4		Solomon Islands -	6 45	2	
				Erronau or Futuna	7 24	4	
<i>Bass Strait.</i>				Sandalwood Bay	6 0	6?	
-	12 5			Fiji Islands - }			
-	1 0			Port Nukulan or			
-	11 30	8		Rewa Road, }	6 47	5½	
ock }	10 30	10		Fiji Id. - }			
le - }	9 35	6		Balade Harbour, }	6 30	4?	
s -	12 20			New Caledonia			
-	11 10			Port Vao, Isle of	8 6	4	
-	11 10	8		Pines, New			
				Caledonia - }			
<i>Tasmania.</i>				Prony Bay, New			
-	11 40	9		Caledonia - }			
ort }	12 5	10	7½	Port de France, }	8 25	4	
n) }				New Caledonia			
				Port St. Vincent,	5 50	4½	
				New Caledonia			
				Woodlark Island	7 15	4	
				Louisiade Archip.			
				Port Carteret, New		6	
				Ireland - }			

Augusta, when the wind veers round to West and South and blows strong, the rise has as much as 16 feet. Commander John Hutchison, R.N., Admiralty Survey, South alia, 1862.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>				
Lord Howe Island	8 30	6		<i>Tierra del Fuego, S. W. Coast.</i>			
Norfolk Island -	7 45	7			<i>h. m.</i>	<i>ft.</i>	<i>ft.</i>
Campbell Island -	12 0	5		Cape Horn -	4 40	9	
Raoul or Sunday Id.	6 0	5		St. Francis Bay -	4 0		
<i>Islands in North Pacific.</i>				St. Martin Cove -	3 50	8	
Karakoa Bay, }	3 49			Middle Cove -	3 30		
Owyhee -				Goree Road -	4 0	8	
Honoruru, Sand- }	4 0	2		Lennox Cove -	4 40	8	
wich Islands -				Nassau Bay -	4 0	6	
Pouinipet Island, }	6 0	4½		Good Success Bay -	4 3	6-8	
Caroline Islands }				Packsaddle Bay -	3 30	6	
Seypan Island, }	6 45	2½		Orange Bay -	3 30	5	
(Ladrone Ids. - }				New-year Sound -	3 30		
Pelew Islands -		6		Adventure Cove -	3 10	4	
<i>South America, Strait of Magellan.</i>				March Harbour -	3 10	6	
Cape Virgin -	8 30	36 - 42		Doris Cove -	3 0	4	
Cape Espiritu Santo	8 30	36 - 42		Stewart Harbour -	2 50	4	
Possession Bay -	9 0	36 - 42		Townshend Harbour	2 30	5	
Cape Orange -	3 0			Fury Harbour -	2 30	4	
First Narrows -	9 0	36 - 42		North Cove, Fury }	2 30	4	
Philip Bay, east side	9 30	24		Island -			
Gregory Bay -	9 45	23		Hewett Bay -	0 30	6½	
Second Narrows -	10 0	23		Bedford Bay -	0 30	7½	
Peckett Harbour -	12 0	6		Smyth Harbour -	12 0	6½	
Laredo Bay -	11 30	9		Noir Island -	2 30	5	
Santa Magdalena }	12 0	10		Laura Harbour -	1 0	6	
Island -				Cape Castlereagh -	2 50	4	
Port Famine -	12 0	6		Cape Gloucester -	1 30	5	
Cape San Isidro -	1 0	8		Cape Inman -	2 0	4	
St. Nicolas Bay -	2 6			Latitude Bay -	2 5	4	
Cape Froward -	1 0			Week Islands -	2 0	5	
Port San Antonio	12 0	7		Dislocation Harbour	1 40	4	
Labyrinth Islands-	0 30	5½		Diego Ramirez }			
Port Gallant -	9 0	5½		Islands -	4 0	6	
York Road, }	2 0	9		<i>Patagonia, West Coast.</i>			
English Reach }				Evangelists -	1 0	5	
Bachelor River -	1 40	5		Port Henry -	12 0	5	
Borja Bay -	1 50	6½		" Barbara -	12 28	4	
Playa Parda Cove-	1 8			San Tadeo River -	11 45	6	
Port Tamar -	3 5	5		Port San Domingo	12 0	7	
Valentine Harbour	2 0			Piti-Palena -	12 23	10	
Harbour of Mercy-	1 22	4		Tictoc Bay -	1 45	11	
Cape Pillar -	1 0			<i>Chonos Archipelago.</i>			
<i>Smyth, Sarmiento, Wide, and Messier Channels.</i>				Port Otway -	11 37	6	
Goods Bay -	0 30	7		San Andres Bay -	0 45	5	
Fortune Bay -	0 50	7		Port San Estevan	0 15	5	
Welcome Bay -	0 50	7½		Anna Pink Bay -	0 45	5	
Puerto Bueno -	1 40	8?		Vallenar Road -	0 18	5	
Guia Narrows -	2 10	8		Port Low -	0 40	7	
Fury Cove -	1 15			<i>Chiloe Archipelago.</i>			
Eden Harbour -	12 30	5		Huafo Island -	12 0	7	
Halt Bay -	0 30	8		Cucao Bay -	12 0	6	
Middle Island -	12 0			Port San Carlos, }	11 15	6	
				Town -			

e.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.				
Carlos	0 14	6					
English	0 4						
	0 50	10					
lock	0 50	16					
Passage	0 30	9					
let	0 48	16 - 20					
ve	0 28						
und	1 3	15½					
d	0 31	18					
Harbour	0 54	18					
	0 11	18					
	0 26						
Islands	0 35						
uff	0 57	20					
ve	0 55	20					
d	0 29						
et	1 10	17	13½				
nd		20					
Head	1 25	15½					
Inlet	0 44	14					
land	1 5						
ort	1 18 or 0 47	18					
each	1 15	16					
nd	0 50	18					
s Point-	1 15	16					
y	0 40	14					
rows	1 15	16					
Peru.							
	h. m.	ft.	ft.				
Iquique Road	8 45	5					
Lobo Point	8 0						
Arica Road	8 0	5					
Ylo Road	8 15	6					
Islay	8 53	7					
Quilca River	8 0	6					
Point Lomas	8 19	5					
Atico Road	8 53	5					
Port San Juan	5 10	3					
" San Nicholas	5 15	3					
Yndependencia Bay	4 50	4					
Pisco Bay	4 50	4					
Callao Bay	5 47	4					
Huacho Bay	4 45	3					
Supé Bay	4 50	3					
Guarmey Bay	6 10	2					
Samanco or	6 30	2					
Guambacho Bay	5 0	2					
Port Malabrigo	4 0	3					
Lambayeque Road	3 20	3					
Port Payta	4 0	10					
Malpelo Point							
Ecuador.							
Sta. Clara Island	4 0	11					
Morro, Sandy Point of	5 0	11					
Puna Island	6 0	11					
Guayaquil	7 0	11					
St. Elena Bay	1 18	8					
Salango Id.	0 41	12					
Port Manta	3 4	6					
Caracas River	3 30	10					
Cape Pasado	3 30	10					
Atacames Bay	3 37	13					
Santiago River	3 30	13					
Tumaca Road	2 33	12					
Sanguianganga (entrance)	4 10	9					
Galapagos Islands.							
Charles Island	2 10	6					
Albemarle	2 0	6					
Chatham	2 23	6½					
Indefatigable	1 56	6					
James, I., West-end	3 10	5					
" N. side	2 34	5					
" Adam Cove	2 14	5					
Tower Id.	?	?					
Culpepper Id.	?	?					
Wenman Isles	2 10						
New Granada and Veragua.							
Port Buenaventura	4 0	13					
(Negrilla Reef)	6 0	13					
" off the Town	6 0	12					
San Juan River	3 40	12					
Cabita Bay	4 0	12					
Port Utria							



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Cupica Bay -	3 30	13		Columbia River, }	0 15	7½	
Octavia Bay -	3 30	13		Entrance -			
Pinas Bay -	3 15	14		Astoria* -	0 42	7½	6
Chepo River -	3 40	16		Nee-ah Harbour* -	12 33	7½	6½
Pedro Gonzales, }	3 50	16		Port Townshend* -	3 49	5½	5
(Trapichi Id.) -				Fort Steilacoom* -	4 46	11	9½
Chamé Bay -	4 0	16					
Saboga -	4 0	14					
Panama Road -	3 23	15 - 22	10 - 16				
Port Nuevo -	3 10	12					
Parida Island -	3 15	10½					
<i>Central America, West Coast.</i>				<i>Vancouver Island, Juan de Fuca Strait, and British Columbia.</i>			
Nicoya Gulf (Port	3 9	10		Esquimalt Harb.†	irr.	7 - 10	5-8
Herradura) -				Victoria Harbour†	irr.	7 - 10	5-8
Port San Juan del				Inner Channels			
Sur -	3 8?	10?		leading from			
Port Realejo -	3 6	11		Juan de Fuca	irr.	10 - 12	
Port la Union, }	3 15	10½	8½	Strt. to Haro St.			
G. of Fonseca -				Port Discovery -	2 30	7	
Acajutla Road -	2 25	9		Nisqually, Puget	6 0	18	15
				Sound -			
				Fane Id., Plum-	irr.	12	
				per Sound -			
				Drayton Harb.,	2 0	12	
				Semlahmoo Bay	6 30	7 - 10	
				Fraser River (entr.)			
				Burrard Inlet,	6 0	16	
				G. of Georgia -			
				Plumper Cove,	noon.	12	
				Howe Sound†			
				Port Graves†	noon.	12	
				Nanaimo Harbour	5 0	14	
				G. of Georgia -			
				Nanoose Harbour,	5 0	15	
				Vancouver Id.			
				Pender Harbour,	6 0	13	
				Strt. of Georgia†			
				Hernando Island,	6 0	13	
				Strt. of Georgia			
				Waddington Harb.,	6 0	13	
				Bute Inlet -			
				Gowlland Harb.,	5 30	11	
				Discovery Pas-			
				sage -			
				Cameleon Harb.,	3 0	16	11½
				Nodales Channel			
				Forward Harb.,	3 0	16	11½
				Beaver Creek,			
				Loughborough	3 0	16	11½
				Inlet -			
				Topaze Harbour -	3 0	16	11½
				Knox Bay -	12 0	16	
				Port Neville -	0 30	17	
				Port Harvey§	0 30	10	
				(Call Creek) -			
				Beaver Cove -		15	
				Alert Bay, Cor-		15	
				morant Id. -			
				Beaver Harbour§	0 30	15½	
				Shucartie Bay†		12	
				Bull Harbour,	0 30	12½	
				Goletas Channel†			

\* From the U.S. Survey, the times of High Water being the Corrected and not the Vulgar Establishm

† May to October, from Midnight to 3 a. m. November to April from Noon to 3 p. m.

‡ From observations made in the month of October.

§ From observations made in May.

Place.	High Water, Full and Change.	Range.		Place.	High Water, Full and Change.	Range.		
		Springs.	Neaps.			Springs.	Neaps.	
	h. m.	ft.	ft.	<i>America, North West Coast.</i>				
en and Tra- Harbours, n Charlotte nd ss Harbour, rp Passage Harbour, Sound Harb. " no Sound, couver Id. sh Inlet " te Inlet " i-Kinsh t ot Sd. " nza Inlet " litz Inlet " a Sound " iat Harb. " y Sound, nd Harbour quot Sound -	12 0 12 0 12 0 12 0 12 0 11 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0	16 16 16 16 16 11 12 12 12 12 12 12 12 12 12 12 12 12	11½ 11½ 11½ 11½ 11½  11 12 12 12 12 12 12 12 12 12 12 12	Port Kuper Portland Inlet, (Salmon Cove) Sitka* Behring Bay Port Etches " Chalmers " Chatham Ounalashka Island Cape Roshnoff Good-news Bay Golovnin Bay Port Clarence Chamisso Island	- - - - - - - - - - - - - - - - - - -	h. m. 1 40 1 8 0 34 0 30 1 15 1 0 1 0 7 30 7 30 6 15 6 23 4 25 4 42	ft. 13 16 5-7 9 9½ 13½ 12 7½ 15 13½ 3½	ft. 10½

the rise at Sitka as given by Commander Pearce, H.M.S. Alert, in his remarks in 1860, does not 7 feet, but on the authority of Commander Pike, H.M.S. Devastation (1862), the local pilots at the rise sometimes is as much as 16 feet.

# T I M E

OF

## HIGH WATER ON FULL AND CHANGE DAYS

AT THE PLACES GIVEN IN THE PRECEDING PAGES;

### ARRANGED ALPHABETICALLY;

*With the Rise of the Tide at Springs and Neaps.\**

(When a query, thus?, is placed after the Time of High Water and the Rise, it indicates that what is given are approximations.)

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	b. m.	ft.	ft.		b. m.	ft.	ft.
Abaco, Bahamas - -	8 0	3		Agoda Pnt., Hindoostan, W. Coast.	10 30	9	
Abbey Head, England -	11 10	23	17½	Aguilas Cape, Africa, S. Coast.	2 50	5	
Abd-ul Kuri, Indian Ocean	8 30	6		Air Point, River Dee, England.	10 54	25	19
Aberdeen, Scotland - -	1 0	12	10	Aix, Ile d', Charente R., France.	3 20	17	12½
Aberdovey, Wales - -	8 0	15		Akaroa Harb., New Zealand.	3 24	8	6
Abervrach, France - -	4 14	22	16	Akasi, Japan Sea -	6 36	6½?	
Aberystwyth, Wales -	7 31	13½	10	Akyab, Aracan R., Bay of Bengal.	9 45	9	6
Abrolhos, Brazil -	3 20	6-7		Al Bidá, Persian Gulf -	8 30?	6?	
Abtao I, Patagonia, W.C.	0 50	18		Alabat Harbour, Luzon -	10 0	9	
Abú-shehr, Persian Gulf	7 30	7		Alan Island, Patagonia, W. Coast.	0 31	18	
Acajutla, Central America	2 25	9		Albany Ids. (Port Albany) Australia, E. Coast.	12 15	10	7
Acapulco, Mexico, W. Cst.	3 6	1½		Albemarle Id., Galapagos	2 0	6	
Acheen Head, Sumatra -	8 45	8		Port, Falkland Islands.	7 15	7	
Achillbeg, Ireland - -	5 14	10½	8	Albert River (Kangaroo Point) Australia, N. Coast.	7 30	10-13	
Adams Port, (Mary Id.) Yellow Sea.	2 0	10		Aldabra Ids., Mozambique	5 0	10	
Adelaide Port, Australia, S. Coast.	5 44	6		Aldborough, England -	10 45	87	6½?
Aden and adjacent Bays, Arabia, S. E. Coast.†	{ 7 30 to 9 30 }	7	4½	Alderney, English Chan-	6 46	17	12½
Adenara, Flores, Malay Archipelago.		8		Alert Bay, Cormorant Id., Johnstone Strait, Vancouver Id.		15	
Admiralty G., Australia, N.W. Coast.	12 0			Alexander Port, Africa, S.W. Coast.	3 0	5	
Adolphus Id., Torres Strt.	12 15	10		Algeciras, Spain -	1 49	4	2½
Adou Atoll, Maldives -	1 0	4		Algoa B., Africa, S. Cst.	4 0	4-5	
Adou Matte Atoll, Maldives.	3 0	4		Alligator Rvr. Australia, N. Coast.	8 40	19-20	
Adventure Cove, Tierra del Fuego.	3 10	4					
Port, New Zealand.	12 20	8	6				
Sound, Falkland Islands.	5 30	5½					
Agadir, or Santa Cruz, Africa.	12 45	9					
Aggerminde, Jutland -	4 9	2					
Agnes, St., Scilly Isles -	4 30	16	12				

\* By the Rise of the Tide is meant its vertical rise above the mean low-water level of Spring Tides.

† From a Survey of Aden Anchorage by Commander Dayman, R.N., H.M.S. Hornet, 1863; but according to the Surveyors of the Indian Navy, springs at Aden rise 8½ feet.

e.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
of Forth,	3 18	17½	15	Aor Pulo, Sumatra, N.E. Coast.		5	
many - -	5 19	7		Aotea Harb., New Zealand	10 0	12	9½
Ioluccas -	0 33	7		Apalachicola B., Gulf of Mexico.		2½-4	
, Netherlands	9 0	7		Appeetetat B., Gulf St. Lawrence.	11 10	5?	3?
llum Rd., "	11 30	7		Appin Port (Loch Linnhe), Scotland.	5 26	12½	8½
, Nova Scotia	10 30	8	5	Appledore, England -	5 28	23	16½
as, (St. Joseph Ocean.	5 0	8½		Aquin Bay, St. Domingo	irr.	2-3?	
ales - -	10 30	18?	13?	Aracan R. (Bar), Bay of Bengal, E. Coast.	9 45	9	6
er Harbour),	12 0	18½	14½	Araçati, Brazil - -	6 0	8	6
st Coast.				Araish El, Africa, N. Cst.	1 30	9-12	
, Lombock -	8 0	6		Arasaig, Scotland -	5 50	13½	10
Indian O. -	11 0	3		Arauco Bay, Chile - -	10 15		
, Persian G.	11 40	6		Arbroath, Scotland -	1 35	14	11
G. of Tartary	11 40	5-6		Arcachon, France - -	4 37	11½	9½
s., Port Blair,	10 0	9	6	Arcas Rks. G. of Mexico	noon	1½	
ean.				Ardglass, Ireland -	11 0	16	12
ortCornwallis	10 0	8¾		Ardintallan, Loch Feochan, Scotland.	5 31	9	6½
rait, Indian	10 24	9½		Ardrishaig, Loch Fyne -	11 53	9	7½
y, Madagas-	3 30	7		Ardrossan, Scotland -	11 45	10	8
B., Patagonia.	0 45	5		Arenas Pt., San Carlos, Patagonia, W. Coast.	0 14	6	
t., Bay, G.	irr.	1-2		Argyle, Bay of Fundy -	9 27	12½	10½
rgin Islands	9 0	1½		Arica Road, Peru - -	8 0	5	
Inyang, S.	6 35	4		Arichat, Nova Scotia -	8 10	5	4
r, Africa, E.C.		13		Arinagour, Coll Id., Scotland, W. Coast.	5 39	12½	9½
es - -	12 32	4½		Arkhangel, White Sea -	7 28	2½	
i, Hindoos-	10 30	9		Arklow, Ireland - -	8 45	4	3
ast.				Arnhem B., Australia, N.C.	8 0	6-8	
ena, Africa,	2 30	8		Arroa, Malacca Strait -		10	
st.				Arthur Port, Tasmania -	7 52	4	
i., Patagonia,	0 45	5		Arundel, England -	12 25		
England -	11 56	20	14	— (Bar) - -	11 35	16	11½
United States	4 38	1	1	As Rocas, S. Atlantic -	5 15	10	
Cape Breton	8 34	6	4½	Asaph St., B., Australia,	5 45	14	
United States	11 0	10¾	9	N. Coast.			
Id., Africa	3 45	5		Ascension Id., S. Atlantic	5 30	2	
G. St. Law-				Askaig Port, Islay -	4 58	6¼	4
t Cape -	1 0	5	3	Astoria, Oregon -	0 42	7½	6
ir Bay -	1 10	5	3	Atacames Bay, Ecuador	3 37	13	
st Point -	2 0	6	4	Atchafalay Bay, G. of Mexico.	irr.	2-2½	
harb. R. St.	9 0	4	2	Athline, Loch Seaforth -	6 16	15	10
		2		Atico Road, Peru - -	8 53	5	
(English				Auckland Harb., New Zealand, N. Island.	7 5	11	9
ribbean Sea.				Augustine St., U. States	8 21	5	4
Bay (Port	4 0	5		— St., B., Madag-	4 30	13	
Madagascar.				gascar, W. Coast.			
St. Cuba		1½		Aux Cayes Bay, St. Domingo.	irr.	2-3?	
Port, Pata-	10 40	28		Avacha B., Kamchatka -	3 30	6½	4½
Coast.				Avon Isles, Australia, E.C.	8 30	5	
— Ma-	12 0	7		Avon River, Bigbury Bay, England.	5 47	16½	11½
G. St. Law-	10 30	5	3				
gium - -	4 25	15					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Awasisma (Inland Sea) Japan.	h. m. 0 14	ft. 7	ft.	Barataria Bay, Gulf of Mexico.	h. m. irr.	ft. 1½	ft.
Awanni R., New Zealand	7 44	7		Barbados, Caribbee Ids.	irr.	2	
Axim, Africa, W. Coast.	4 30	4		Barbara Port, Patagonia, W. Coast.	12 28	6	4
Aylen Bay, Yellow Sea	2 30	6	4	— I. Santa, California	8 0	3½	
Aymann, Persian Gulf	11 20	6		Barbe St., Sumatra, N.E. Coast.	6 0	6	
Ayr, Scotland - -	11 50	8½	7½	— Sta. Id., California	8 0	3½	
— Point of, I. of Man	11 7	20?	16?	Barclay Sound (Island Harbour), Vancouver Island.	12 0	12	
Bab-el-Mandeb, G. of Aden	12 0	7		— Uchucklesit Harbour, Vancouver Id.		12	
Bachelor River, Magellan Strait.	1 40	5		Bardsey Id., Wales -	7 40	15	
Bacuit B., China Sea, E.C.	10 0	6		Barfleur, France - -	8 51	17	13½
Badas Id., Linga Bay, Sumatra.*	6 0 PM	12		Barmouth, Wales - -	7 41	17	13½
Badong B. (S. Cst.), Baly	11 0	9½		Barnstable, United States	11 22	10	8½
Bagroo River, Sherbro River, Africa.			11	Barnstaple Bar, England	5 30	19	14
Bahia, Brazil - -	3 30	8		Barnstaple Bridge, England.	6 28	10½	7½
Bahrein, Persian Gulf -	5 30	7		Barquero (entrance), Spain, N. Coast.	3 0	15	
Balabac Id., China Sea, E. Coast.	11 0	5		Barra, Id. (North Harbour), Scotland, W. C.	5 48	11½	8½
Balade Harb., New Caledonia.	6 30	4?		Barracouta Harb., G. of Tartary.	10 0	3½	
Balambangan Id., Borneo, N. Coast.	10 0	6-8		Barragan Bay, Rio de la Plata.*	7 0	5-9	
Balasure R., B. of Bengal, W. Coast.	10 0	15		Barren Id., China Sea, E. Coast.	9 30	5½	
Balbriggan, Ireland -	10 40	11		Barren Ids., Madagascar	4 45	12	
Bald Head, United States	7 26	5	4½	Barrow Harbour, Newfoundland.	7 10?	5?	
Ballachulish (Loch Leven), Scotland.	5 43	11		Barton Port, (Bubon Point), China Sea E.C.	10 55	6	
Ballinacourty, Dungarvan, Ireland.	5 12	12½	9½	Bas, Ile de, France -	4 49	23	17
Ballinskellig Bay, Ireland	3 40	12	7½	Basiduh, Persian Gulf -	12 0	10	
Ballycastle B., Ireland -	6 25	3	2	Basil Bay, Korea, W. C.	4 15	18	10
Ballycotton, Ireland -	4 54	12	9½	Basque Port, Newfoundland.	8 55	5½	3½
Ballycrovane, Kenmare River, Ireland.	3 42	10½	7¾	Basrah (Bar), Persian Gulf.	12 0	*	
Ballynakill Bay, Ireland	4 40	12½	9½	— Town - -	6 0?	9?	
Ballyness (Bar), Ireland	5 22	11½	8½	Bassein R., Bay of Bengal	10 0	9	6
Ballysadare (Quay), Ireland.	6 0	8½	5½	Batanes, Bashee Islands, China Sea, E. Coast.		4	
Ballyshannon (Bar) -	5 18	11½	8½	Batavia, Java - -	10 0	2	
Ballyweel, Ireland -	5 23	12½	8	Batchian, Gilolo, Moluccas	1 0	6	
Balta, Scotland - -	9 45	6	4½	Bate (Gulf of Cutch), Hindoostan, W. Coast.	12 20	12	8
Baltimore, Ireland - -	4 23	10½	8½	Bathurst, G. St. Lawrence	3 15	7	4
— United States	6 33	1½	1½	Bathz, Netherlands -	3 15	15	
Banana Ids., Africa, W.C.	8 15	9		Batiscan, R. St. Lawrence	9 48	3½	2
Bancoot R., (entrance) Hindoostan, W. Coast.	2 0	12		Batticalao River, Ceylon	5 0	2-3	
Banda, Moluccas -	4 0	6?		Bay of Harbours, Falkland Islands.	6 0	5	
Bander Aluleh, G. of Aden	6 45	6		Bay of Islands. (Motu Mea Islet) New Zealand.	7 15	9	6
— Gori, Gulf of Aden	8 45			Bay of Mercy, Banks Land		2	
— Shaab, Ind. Ocean	7 0	7		Bayonne (Bar), France -	3 45	12	10
— Feikam, Arabia, S.E. Coast.	10 0	8½					
Banff, Scotland - -	0 28	10½	8				
Bantam, Java - -		5					
Bantry Harb., Ireland -	3 47	10	7½				
Baracoa, Cuba - -	7 23	2½					

\* From observations made in the month of September by W. Stanton, Master Commanding H.M. Surveying Brig Saracen.

† In the Rio de la Plata the rise is greatly influenced by the winds, the water being raised by S.E. winds and depressed by those from N.W., causing at Buenos Ayres a difference sometimes of 12 feet.

ce.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
pe, Africa, E.C.	4 15	10		Beypoor R. (entrance),	0 15	5	
d, England -	11 20	20	15	Hindoostan, W. Cst.			
Prince Edward	9 0	6	3	Bias Bay (Tooniang Id.,)	8 0		
				China E. Coast.			
C. Breton Id.	8 30	4½	3	—— (Tsangchow Id.)	8 30		
d., Gulf St.	6 30	6	4	China, E. Coast.			
United States -	7 26	3½	2½	Bic Id., G. St. Lawrence	2 15	14	8½
England -	{ 10 25	10	8½	Biddah R., B. of Bengal,	10 0	14	
Wales -	{ 12 15			W. Cst.			12
e, Vancouver	10 32	21½	16½	Bideford, England -	6 7	16	
		15		Bijouga Islands, Arcas	10 10	11-14	9
				Channel, Africa, W. Cst.			
				Bissao,	11 0	8	
				Africa, W. Cst.			
				Orango			
				Channel, Africa, W. Cst.	10 0	11	
				Bilbao (Bar), Spain -	3 0	13	
				—— (Town), „ -	3 20	9	
				Biloxi, G. of Mexico -	irr.	2	
				Bima Bay, Sumbawa -	Noon.	6	
				Binkang B. Chira Sea,	11 30	5	
				W. Cst.			
				Binnic, France -	6 3	30	22½
				Bintula R., China Sea,	5 45	6	
				E. Cst.			
				Bird Island, China Sea,	9 30	6	
				E. Cst.			
				—— Ids., Africa, S. Cst.	4 0	4-5	
				—— Id. Light, United	7 59	5½	4½
				States.			
				Blaavand Point, Jutland	1 44	5	
				Black Ball Harb., Ireland	3 40	9½	7½
				—— Rock, Bay of Fundy	11 29	36	31
				Blacksod Bay (Quay), Ire-	4 47	10	8½
				land.			
				Blair Harb., China Sea,	8 50	9	
				W. Cst.			
				Blakeney, England -		9	
				—— (Bar) „	6 30	15	
				Blanche Port, Streaky	1 0	5	
				Bay, Australia, S. Coast.			
				Blankenberg, Belgium -	12 48	13	11
				Blanco Cape, Africa, W.C.	11 46	6	
				Blas, San, Mexico, W. Cst.	9 41	6½	
				—— La Plata -	2 0	12	10
				Blasket Islands, Ireland	3 30	11½	8
				Blewfields, Mosquito Coast	1 50	2	
				Bligh Sound, New Zea-	10 45	8	6
				land.			
				Block Id., United States	7 36	3½	2½
				Bluff Cay, Bahamas -	7 0	4½	
				Bluff Harb., New Zealand	1 18	8	6
				Blunden Harbour, Brit.	12 0	16	11½
				Columbia.			
				Blyth, England -	3 15	15	11
				—— R., Southwold,	10 20	6½	4½
				England.			
				Boca de Varadero, Cuba	8 39	2	
				Bodega Port, California	11 17	4½	3½
				Bodkin Light, United	5 42	1½	1
				States.			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Spring.	Neap.			Spring.	Neap.
		h. m.	ft.			h. m.	ft.
Bojador Cape, Africa -	12 0	8?		British Sound, Madagascar, E. Cst.	4 0	9½	
Bolt Head, England -	5 45	15?	11?	Broad Sound, Australia, E. Cst.	11 0	20-30	
Bombay Dockyard, Hindoostan, W. Coast.	11 40	12-17		Broadhaven Har., Ireland.	5 0	10½	
Bonacca Id., Bay of Honduras.	9 0	1½		Broadway R. (entrance), China, E. Coast.	11 0	7½	
Bonanza, Spain -	2 0	12½	8	Broken Bay, Australia, E. Coast.	8 0	6-9	
Bonne Esperance Harb., G. of St. Lawrence.	9 15	5	2½	Broom Loch (Ullapool)	6 40	14½	10
Bonny R. C., Africa, Wst.	5 0	9		Broughty Ferry, Scotland	2 22	14½	11
Booby, Island, Australia, N. Coast.	4 30	8		Brouwershaven, Netherlands.	2 15	10	8
Bordeaux, France -	6 50	14	12¾	Bruit River, Borneo -	3 0	11	
Borja B., Magellan Strait	1 50	6½		Bruni R., China Sea, E. Coast.	11 0	12	
Borkum (Road) Germany	10 30	8-10		Brunsbüttel, Germany -	1 58	9	
Boscastle, England -	5 15	25	17½	Brunswick B., Australia, N.W. Cst.	12 0	24	
Boston (Sluice), England	7 0	12		Brush, Yarmouth, England		5½	4½
— Deep (Clay Hole) "		21½		Bubon Point, Port Barton, China Sea, E. Coast.	10 55	6	
— Hob Hole " "		17		Buctouche River, G. St. Lawrence.	3 30?	4?	2
— (Charlestown Naval Yard) United States.	11 27	11½	10	Budehaven, England -	5 45	23	17
— Light, United States	11 12	11	9½	Buenaventura Port, Central America (Negrilla Reef).	4 0	13	
Botany Bay, Australia, E. Cst.	8 15	7-8		" off the town -	6 0	13	
Boteler R., Madagascar -	4 30?	15?		Buenos Ayres, S. America, E. Coast.*	12 0	3-5	
Boucaut, France -	3 39	8¾	6	Buffalo R. (entrance), Africa, S. Cst.	3 45	4½	
Boughton Harb., Prince Edward Island.	8 40	5	2¾	Bulama Island (Arcas Channel), Africa, W. Coast.	10 10	14	11
Boulogne, France -	11 25	25	19½	Bull Harbour, Goletas Channel, Vancouver Id.	0 30	12½	
Bourbon Id., Indian Ocean, see Reunion Id.				Bull Id., Newfoundland	7 22	3½	2
Bouro (Cajeli Bay) Moluccas.	1 0	6		Bulls Id. Bay, United States	7 16	5½	4
Bow Island, S. Pacific -	2 40	3		Bulls Mouth (Achill Sound, N. entrance,) Ireland.	5 38	10½	7½
Bowen Port, Australia, E. Cst.	9 35	16		Bulsaur R., Hindoostan, W. Cst.	1 45	18	
Bowling, R. Clyde, Scotland.	0 39	9		Bulnagan O'sta Ana Port, Filipinas.	12 0	5½	
Boyanna B., Madagascar, W. Cst.	4 30	15		Bunawe (Loch Etive), Scotland.	7 54	5½	
Bradore Bay, Labrador -	8 45	4	2	Buncrana, Ireland -	5 40	16	
Braha Harbour, Newfoundland.	7 0?	2-3?		Bunessan, Scotland -	5 24	12	8½
Bramble Cay, Torres Strt.	9 15	12		Burburra, see Berbereh.			
Brandy Pots, River St. Lawrence.	3 0	17	10	Burin Harbour, Newfoundland.	8 45	6½	4½
Brass River, Africa -	4 0	6		Burntisland, Firth of Forth, Scotland.	2 24	16½	12½
Brava, Africa, E. Cst. -	4 30	8		Burnt Isles, Kyles of Bute, Scotland.	11 50	10	8
Bray Head, Ireland -	10 45	12	9½	Burong I., China Sea -	4 45	7	
Brazos River, G. of Mexico	irr.	1½		Burrard Inlet, Gulf of Georgia, B. Columbia.	6 0	16	
Bréhat, France -	5 51	31	23½				
Brest, France -	3 47	19	13¾				
Bridgeport, United States	11 11	8	6½				
Bridgewater (Bar) England	6 50	35	26½				
Bridlington, England -	4 39	16	12				
Bridport, England -	6 5	11½	7¾				
Brielle, Netherlands -	3 0	5					
Brighton, England -	11 15	19¾	16				
Bristol (King Road) England.	6 56	44	33				
Britannia Bay, Sumbawa	1 0	11-12					

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Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Port, Wales -	h. m. 6 1	ft. 25½	ft. 18½	Campeche, Yucatan -	h. m. 1 45	ft. 2½	ft. 2
see Abú-shehr.				Campobello (Welchpool),	11 21	23½	20
R. Bar, Persian	12 0			B. of Fundy.			
, Burias Island	12 30	6		Cancale, France - - -	6 20	37	27
lands, Hudson	6 50			Canna Id., Scotland, W.	6 19	14	9½
y, Australia, E.	9 45	6		Coast.			
e, Australia,	9 45	6		Canso Gut (Plaister	9 10	4½	3
t.				Cove), Nova Scotia.			
ay, New Gra-	3 40	12		Har., C. Breton	7 48	6½	4½
ver, Africa, W.	7 45	8		Island.			
ain - - -	1 45	9½		Cantin Cape, Africa -	10 0	10	
nce - - -	10 57			Canton River (entrance),	10 0	8	
nen (Bar) -	6 10	26	19½	China.			
on, Wales -	9 33	13½	10½	Canton River } In Mar.	2 40	5½	
St. Domingo -	8 07	17		(Kuper Id.) } In May			
h, Ireland -	10 51	5½	5	& June } 1 40	5½		
, Bouro -	1 0	6		Cape Coast Castle, Africa,	4 30	6	
ance - - -	11 49	19½	15½	W. Coast.			
each, Patagonia,	1 15	16		Cape May Landing, U.S.	8 19	6	5
st.				Caracas River, Ecuador -	3 30	10	
Fort, Patagonia,	{ 1 18	18		Caraquette Harbour, G. of	2 40	6	3
iver, Gulf of	0 47	2½	1½	St. Lawrence.			
Bengal - - -	2 30			Cardiff, Wales - - -	6 59	38	29
land, Bristol	6 0	24?	16?	Cardigan, Wales - - -	7 1	12	9
l.				Bay, Prince	8 40	5	3½
, Africa, W. Cst.	5 0	9		Edward Island.			
Harbour, New	11 40	1½	1	Careening Bay, Australia,	11 45	30	
l.				N. W. Coast.			
l, Isle of Man-	11 17	16½	13	Caremapu, Patagonia,	0 50	10	
ads, Hindoostan,	0 15	5		W. Coast.			
st.				Cargados Garayos Shoals,	2 0	4	
y, Peru -	5 47	4		Indian Ocean.			
astle Pt.), Eng-	11 30	13	9½	Cargreen, R. Tamar,	5 47	14½	10½
l.				England.			
l. Tamar, Eng-	6 6	12½	8½	Caribou Harbour, Nova	10 0	6	4
, Babuyan,	6 0	6		Scotia.			
Port, Spain -	3 0	15		Carleton Point, Gulf St.	3 0	6	4
Banda Sea,	noon	6		Lawrence.			
arb., Australia,	12 0	37½		Carlingford (Bar or Cran-	11 0	14	11
oast.				field Point), Ireland.			
Harb., Nodales	3 0	16	11½	Carlisle Port, England -	12 10	20	14
l, B. Columbia.				Carlos, San, Port, Pata-	11 15	6	
R., Africa, W.	4 07	6		gonia, W. Coast.			
Cape, New Zea-	6 0	8	6	(Arenas Point)	0 14	6	
Island, South	12 0	43?		Patagonia W. Coast.			
Town, Gulf St.	4 0	10	7	(English Bank)	0 4		
ce.				Patagonia W. Coast.			
on, Scotland -	11 45	8½	6	Carlos, San, Port, Falk-	7 0	8	
				land Islands.			
				Carouge River, R. St.	7 15	16	11
				Lawrence.			
				Carrigaholt, Ireland -	4 44	14	10½
				Carsaig, Scotland -	5 28	10	7½
				Cartagena, New Granada	11 0	1½	1
				Carteret, France -	6 25	31	22½
				Port, New Ire-		6	
				land.			
				Cascumpeque H., Prince	5 40	3	2
				Edward Island.			



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Cashla Bay, Ireland -	4 33	16	12	Chapu Road, Hang-chu Bay, China, E. Coast.	12 0	25	ft.
Casquets, English Channel	6 45	15½		Charles Cape, United States.	7 45	5	
Castillos, Cape, Rio de la Plata.*	8 30	2		Charles Id., Galapagos -	2 10	6	
Castlereagh Cape, Tierra del Fuego.	2 50	4		Charleston, United States	7 26	6	5
Castletown, Bearhaven, Ireland.	4 14	9½	7½	Charlottetown, Prince Edward Island.	10 45	9½	7
Isle of Man -	11 10	20	16	Charlowka R., Lapland	8 8	12	
Castletownsend, Ireland -	4 21	10½	8	Chateau Bay, Labrador -	7 35	3½	1
Castries B., G. of Tartary	10 30	6		Chatham, England -	1 2	17½	14
Castro, Patagonia, W. Cst.	0 11	18		Id., Galapagos	2 23	6½	
Casuarina Point, China Sea, E. Coast.	9 30	6½		Port, America, N. W. Coast.	1 0	12	
Catalina Harbour, Newfoundland.	7 0	6	4	Chatte Cape, United States	12 0	13	8
Catharina Sta. I., Brazil -	2 30	3		Chauan Bay, China, E. Coast.	11 0	6½	
Cato Bank, Australia, E.C.	8 0	6		Chausey, Isles de, France	6 9	35	26
Catoche Cape, Yucatan -	9 30	1½		Cheduba, Bay of Bengal -	11 30	8	
Cattawade Bridge, Stour River, England.	1 8	4½		Chee-fow Harb., Yellow Sea, see Chifu.			
Cavalli Ids., New Zealand	8 0	7		Chentabun River, China Sea, W. Coast.	10 0	5½	
Cavern Island, China Sea, E. Coast.	9 30	5½		Chepo River, New Granada.	3 40	16	
Cawee Islands, Gulf St. Lawrence.	1 50	9	5	Chepstow, England -	7 30	38	28
Cay West, United States - N.W. Channel, U.S.	9 30	1½	1½	Cherbaniani Reef, Laccadives, Indian Ocean.	10 0	7	4
Cayenne, Guayana -	3 45	6-11		Cherbourg, France -	7 49	17	12
Cayeux, France - -	11 5	27½	21	Chesilton, England -	6 13	10½	7
Ceara, Brazil - -	4 30	9		Chester (Crane Wharf), England.	0 16	26	
Cedar Cays, United States	0 51	3½	2½	Chester River (Rockhall Creek), United States.	5 23	2½	1
Cedeira, Spain, N. Coast	3 0	15	6	Chesterfield Islet, Australia, E. Coast.	8 30	5	
Centre Id., (Foveaux St.) New Zealand.	12 15	8		Chetican, C. Breton Id. -	8 15	3½	
Ceram, Wahaay Harbour, Moluccas.	6 0	3		Chichester, England -	11 30	14	11
Cerros Id., California -	9 10	7-9	½	Chifu, Yellow Sea -	10 34	8	6
Ceuta, Africa, N. Coast -	2 6	3½		Chimmo Bay, China, E. Coast.	10 20	16	
Chacachacara Id., Trinidad, Caribbean Sea.	3 30	4		Chimney Id., Rees Pass, China, E. Coast.	11 30	12	
Chacao Bay, Patagonia, W. Coast.	0 40	14		Chinchu Harb., China, E. Coast.	12 25	17	
Narrows, Patagonia, W. Coast.	1 15	16		Chin-hae, Yung R., China, E. Coast.	11 20	12½	
Chalky Inlet, New Zealand.	11 5	8	0	Ching-tau Bay, Yellow Sea	6 0	12	9
Chalmers Port, America, N. W. Coast.	1 0	13½		Chipiona, Spain -	1 34	12½	8
Chamé Bay, New Granada.	4 0	16		Chittagong (Bar), Bay of Bengal, E. Coast.	1 15	15	10
Chamisso Id., America, N. W. Coast.	4 42			Chodo Id., Korea, W. C.	6 20	12	
Champion Bay, Australia - W. Coast.	9 10	1		Choiseul Port, Madagascar, E. Coast.	4 0	5	
Champlain R., St. Lawrence.	9 45	3	2	Chosan Harb. or Tsau-liang-hai, Japan Sea.	7 45	7	5
Changchi Id., China, E.C.	9 30	17		Christchurch, England -	{ 9 0 } 5		
Changues Ids., Patagonia, W. Coast.	0 35			Christianstad, Santa Cruz.	{ 11 30 } 5		
					7 30	½	

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Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Christmas Island, Indian Ocean.	h. m. 10 0	ft. ft.		Colombo, Ceylon	h. m. 1 0	ft. ft.	
Christmas Harbour, Kerguelen Id.	2 0	2		Colonsay (Schallasaig) Scotland, W. Coast.	5 18	11	7½
Chuen-pee Point, Canton River.	2 0	7½		Columbia River, (entr.) America, N.W. Coast.	0 15	7½	
Chusan Archipelago, (Vernon Channel,) China, E. Coast.	9 40	14		Componee River, Africa, W. Coast.	10 0	15	11½
Chusan Tinghae, China, E. Coast.	11 0	12	9	Compu Inlet, Patagonia, W. Coast.	1 10	17	13½
Circular Head, Tasmania	11 40	9		Concarneau, France	3 12	13	9½
Clam Point, B. of Fundy	8 27	8½	6½	Condore, Cochín China	3 0	4	
Clara Sta., I., Ecuador	4 0	11		Congo River, Africa W. Coast.	4 30	6	
Clare I., Ireland	4 38	12½	9½	Congoon Bay, Persian G.	7 45	9½	
Clarence Port, America, N.W. Coast.	4 25			Conil, Spain	1 18	11½	7½
Clarence Harbour, Long Island, Bahamas.	8 30	4	3½	Conquet Road, France	3 46	21	15
Clarke Harbour, Bay of Fundy.	8 40	9½	7	Constitucion Cove, Bolivia	10 0	4	
Clayoquot Sound, Vancouver Id.	12 0	12		Conway Cape, Australia, E. Coast.	11 0	18	
Clear, Cape, Ireland	4 0	9	6½	Cook Harb. Newfoundland	7 25		
Clearwater Point, Gulf St. Lawrence.	11 30	5	3	Cooper Port, New Zealand.	3 50	7½	5½
Cleveland Bay, Australia, E. Coast.	7 30	10-12		Copiapo, Chile	8 30	5	
Cley, England, N.E. Cst.		5½		Coquet Road, England, E. Coast.	3 0	14½	11
Cliffden Bay, Ireland, W. Coast.	4 30	13½	10	Coquimbo Bay, Chile	9 8	5	
Clinch Fort, Fernandina, United States	7 53	6½	6½	Cordouan Lthse., France	3 37	13½	10½
Clonakilty, Bay, Ireland	4 30	11	8½	Corentyn River, Guayana	5 10	8½	6
Coacocho Bay, G. of St. Lawrence.	10 30	5	3	Coringa or Cocanada Bay, Bay of Bengal, W. C.	9 10	4-5	3
Cobija Bay, Bolivia	9 54	4		Coringa R. (Bar), Bay of Bengal, W. Coast.	9 0	5	
Cocagne River, G. St. Lawrence.	7 30?	4?	2?	Corisco Bay (Elobey Isles), Africa, W. Cst.	5 0	7	
Cochin Harb. and Road, Hindoostan, W. Coast.	1 0	3½		Cork (Penrose Quay), Ireland.	4 58	12½	10
Cockburn Port, Africa, E. Coast.	4 15	12		Corn Ida, B. of Honduras	1 45	2	
Sound, Australia, W. Coast.	9 0	1-1½		Corner Inlet, S. Australia	11 40	8	
Cockenzie, Firth of Forth, Scotland.	2 16	15½	13	Cornwall, Cape, England	4 35	18?	13?
Cod Cape, United States	11 30	13		Corpach (Loch Aber), Scotland.	5 59	11½	
Codroy Island, Newfoundland.	9 15	6	4	Corran (Loch Aber), Scotland.	5 43	12	8½
Colorado River, La Plata	4 0	9	7½	Corunna, Spain	3 0	15	
Colorados, R. La Plata	3 40	11		Coudres Id. (Prairie Bay), R. St. Lawrence.	4 25	17	10
Cold Spring Inlet, United States.	7 32	5½	4½	Courseulles, France	9 7	20	15½
Coleraine, Ireland	6 24	6½	4	Courtmacsherry, Ireland	4 36	10½	8½
Collier Bay, Australia, N.W. Coast.	11 45	36		Coverack, England	4 35	14½	11½
Colne Point, Colne River, England.	12 0	14	10	Cowes (West), England	10 45 11 45	12½	9½
Colombilla Cay, Pearl Cays, Caribbean Sea.	2 0	2		Coy Inlet, Patagonia, E. Coast.	9 30	40	
				Coyhuin River, Chile	0 52	21	
				Cozumel, B. of Honduras	8 30	1½	
				Crane Island, River St. Lawrence.	5 24	17	13
				Cranford Bay, Mulroy Bay, Ireland.	8 3	4	
				Crapaud, Prince Edward Island.	10 0	8	6

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs	Neaps.			Springs	N.
	h. m.	ft.	ft.		h. m.	ft.	1
Crichton Harbour, Korea, S. Coast.	9 50	11½	8½	Danno R., Hindoostan, W. Coast.	1 30	17	
Crimon Ids., Java Sea -	8 0	6	5	Darnley Id., Torres Strait	9 30	12	
Crinan, Scotland -	4 49	6½	5	Dartmouth, England -	6 16	14½	1
Croc Harbour, Newfoundland.	6 30½	4½		Darwin H., Choiseul Id., Falkland Islands.	6 30	5½	
Croisilles Harbour, New Zealand.	9 0	12	8	Darwin Port, Australia, N. Coast.	5 30	17-24	
Cromarty, Scotland -	11 56	14	11	Dauphin Fort, Madagascar	4 30	7	
Cromer, England -	7 0	14½	11	De Roonpot, North Sea	12 30	12	8
Crow Harb., Nova Scotia	8 0	6½	4½	Deal, England -	11 15	16	12
Crowdy Head, Australia, E. Coast.	9 15	5		Deep Harbour, Fife Sound, B. Columbia.	12 0	16	11½
Crooked Id., Bahamas -	7 0	2½		— Point, Durian Strait	5 0	10	
Crookhaven, Ireland -	4 9	9½	8	Deer Sound, Orkneys -	10 30	10	7½
Cucuo Bay, Patagonia, W. Coast.	12 0	6		Delagoa Bay (Port Melville), Africa, S. Coast.	4 30	15	
Cuckolds Point, River Thames, England.	1 45	19½	15½	Delagoa Bay (Portuguese Factory), Africa, S. Coast.	5 20	12	
Culdaff Bay, Ireland, W. Coast.	5 53	8½	6	— Shefeen Id., Africa, S. Coast.	4 40	12	
Culebra or Passage Id., Caribbean Sea.	9 0	1		Delaware (Breakwater), United States.	8 0	4½	3½
Cullen Harbour, Fife Sound, B. Columbia.	12 0	16	11½	Delftzyl, Germany -	11 15	9-10	
Cullin Id., Patagonia, W. Coast.		20		Delgado C., Africa, E. C.	4 0	16	11½
Culpepper Id., Galapagos	?	?		Delhi River, Sumatra -	4 0	8	
Cumberland Basin, (Sackville) Bay of Fundy.	11 55	45½	38	Demerara R., Guayana -	4 45	9	6
Cumsingmun Harbour, Canton River, China.	12 6	6½		Denham Sound, Sharks Bay, Australia, N.W. Coast.	12 5	5	
Cupehi Point, China, E. C.	8 0			Denial Bay, Australia, S. Coast.	12 15	6	
Cupica Bay, New Granada	3 30	13		Denison Port, Australia, E. Coast.	9 36	6	
Curieuse, Seychelles, Indian Ocean.	5 10	7		Desire Port, Patagonia, E. Coast.	12 10	18½	
Curtis Port, Australia, E. C.	9 40	10-12		Devonport Dockyard, England.	5 43	15½	11½
Cuttyhunk, United States	7 40	4½	3½	Dewghur Harbour, Hindoostan, W. Coast.	11 25	9	
Cutwell Harbour, Newfoundland.	7 0½	2-4½		Diamond Island, Bay of Bengal.	10 30	8	
Cuxhaven, Germany -	1 8	10		— Point, Malacca Strait.	12 0	9½	
Cuyler Harb., California	9 25	5	4	Diego, San, Bay, California.	9 38	5	3½
Cypress Harbour, Sharp Passage, B. Columbia.	12 0	16	11½	Diego, San, Cape, Tierra del Fuego.	4 30	10	
Daggs Sound, New Zealand.	11 30	8	6	— Garcia Island, Indian Ocean.	1 30	6	
Dahouet, France -	6 5	32	23½	— Ramirez Ids., Tierra del Fuego.	4 0	6	
Dalawan Bay, China Sea, E. Coast.	11 0	5		Dielette, France -	6 40	27	20½
Dalcahue, Patagonia, W. Coast.	0 26			Dieppe, France -	11 6	27	20½
Dalhousie Harb., G. St. Lawrence.	3 10	9		Digby Gut, B. of Fundy	11 0	27½	23
Dalkey Island, Ireland -	10 45	13	11	Dillon Bay, Erromango Id., Banks Ids.	5 30	4	
Dalrymple B., Madagascar W. Coast.	5 0	15		Dingle, Ireland -	3 51	10½	7½
— Prt., Tasmania	12 5	10	7½	Discovery Port, America, N. W. Coast.	2 30	7	
Damaun Bar, Hindoostan, W. Coast.	1 30	17					
Dampier Strait, Moluccas		11					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
on Harb., Tierra	h. m.	ft.	ft.	Eden Harbour, Patagonia,	h. m.	ft.	ft.
ego.	1 40	4		W. Coast.	12 30	5	
nd, Hindoostan,	2 0	6		Edgar Port Falkland Is.	7 15	6	
ast.				Edgartown, United States	12 16	2½	2
ance - -	9 39	21	16	Edina, Africa, W. Coast	5 50	4	
, Bay of Bengal		5		Edmonstone, Id., Sherbro			8
ighthouse, U. S.	7 33	7½	7	River, Africa.			
we Bay, Ceylon	1 50	1½		Egg Id. Lt., United States	9 4	7	5½
iver, Bight of	4 17	5		— G. St. Lawrence	2 0	11	6
				Egmont Bay, Prince	3 0	4	2
				Edward Island.			
y, San, Port, Pa-	12 0	7		— Port, Falkland	7 30	11	
, W. Coast.				Islands.			
dee, Ireland -	11 13	11½	9	Eides Fiord, Færoe Ids.	11 0	9½	7½
Harb., Ireland -	5 18	11½	8½	Eigg Id., Scotland -	6 15	14	10
ove, Tierra del	3 0	4		Elbe, Entrance, Germany	12 0	11	
				Elena Sta., Port, Pata-	4 0	17	
Road, Scotland	11 47	11		gonia, E. Coast.			
Comoro Ids.	4 0	11-12		— Bay Ecuador -	1 18	8	
Isle of Man -	11 12	20½	16	Elizabeth Bay, Africa,		5-6	
oad, Bahamas -	8 30	4	2½	S. W. Coast.			
ngland	11 12	18½	15	Ellen Port, Islay -	5 0	5	4
a Reach, Orwell,	12 27	12		Ellenwoods Anchorage,	9 54	13	10½
d.				Bay of Fundy			
Mouth, Carib-	3 0	4		Elliot Port, Australia, S.C.		5-6	
ea.				Emden, Germany -	12 0		
ay, California -	11 41	4½	3½	Ems River, (outer buoy),	10 0	8-10	
Harb., St. Juan	2 0	12		Germany			
a Strait.				Encounter Rock, Yellow	10 44	11	8
t (Bar), Ireland	11 0	11½	9	Sea.			
le of Mull -	5 0	12	10	Endeavour R., Australia,	8 0	5-10	
Bar), Ireland -	11 12	12-14	9-11	N Coast.			
on, Scotland -	0 20	9		— Strait, Aus-	1 0	9½	
Scotland	2 8	14½	11	tralia N Coast			
Hindoostan, W.	10 10	8		Endermo Harbour, Japan	5 30	6	
				English Bank, San Carlos,	0 4		
n, Ireland -	3 51	10½	7½	Patagonia, W. Coast.			
y Ness, Scot-	10 14	10	7	English Harbour, Antigua		2	
				English R., Delagoa Bay,	7 30	5	
Ireland -	10 56	13½	11½	Africa, S. Coast.			
Scotland -	2 32	14½	11½	Enora Bay, Japan Sea -		4	
s, England -	10 45	21½	19	Eran Bay, (Palawan)	10 10	6½	
and, Australia,	9 28	6-10		China Sea, E. Coast.			
t.				Erebus Bay, Barrow Strt.	12 6	8	
ie, France -	12 8	16½	13½	Erme River, Bigbury	5 40	16½	11½
n, Kenmare R.,	3 45	10½	8	Bay, England.			
				Erqui, France -	5 59	33½	24½
s Harb., Ireland	3 57	9½	7½	Erronau or Futuna, S.	7 24	4	
Ireland -	5 27	12½	9½	Pacific.			
Port, Africa,	4 45	12		Escumenac, Pt., Gulf St.	4 10	4	2½
t.				Lawrence.			
y, New Zealand	11 15	10	8	Esperanza Inlet, Van-	12 0	12	
ar), White Sea		3½		couver Id.			
Africa, S. Cst.	2 50	5		Espirito Bay, Brazil -	3 0	4	
ound, Scotland	5 10	10-12		Espirito Santo, C., Ma-	8 30	36-42	
, South Pacific	2 0			gellan Strait.			
, New Zealand	8 55	7		Esquimaux, St. Juan de	irr.	7-10	5-8
, Prince Edward	8 30	3½	2	Fuca Strait.*			
				Essington Port, Australia,	3 24	13	
France -	6 32	31	22½	N. Coast.			
Pt., Australia,	9 39	7					
t.							

\* May to October from Midnight to 3 am. November to April from Noon to 3 pm.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Estevan, San, Port, Patagonia, W. Coast.	0 15	5		Flamand Bay, St. Domingo	irr.	2-3?	
Etches Port, America, N.W. Coast.	1 15	9½		Flamborough Hd., England	4 30	16	
Evangelists, Patagonia, W. Coast.	1 0	5		Flamenco Port, Chile	9 10	5	
Exmouth, England	6 21	12½	8½	Flatholm Ids., Bristol Channel.	6 54	37?	
Exuma, Bahamas	7 20	2½		Fleetwood Port, England	11 12	26½	1
Eyemouth, Scotland	2 15	15½	11?	Wyre Light	11 11	27	5
Eyre Port, Australia S. C.	10 30	6		Flesh Bay, or Bay St. Bras, Africa, S. Coast.	3 30?	6?	
Fair Isle, Shetlands	11 0	5	3½	Fleur-de-lis Harb., Newfoundland.	7 15	2-4	
Fairy Port, Australia, S. C.		4		Flinders Group, Australia, E. Coast.	9 15	8-12	
Falkland Sound (N. entrance), Falkland Ids.	6 45			Florida Cape, United States.	8 34	1½	
(S. entrance)	7 0			Flushing, Belgium	1 20	15	
Fall Harbour, Labrador - W. Coast.	6 40	3½		Fog Ids., Hang-chu B., China, E. Coast.	11 45	17	
Falmouth, England	4 57	16	12	Fogo Id., Newfoundland	7 20	4	
False Point, Bay of Bengal, W. Coast.	8 0	8		Folkstone, England	11 7	20	10
Famine Port, Magellan Strait.	12 0	6		Folly Point, Petitecondee River, B. of Fundy.	11 49	45	30
Fane Id., Plumper Sound, Oregon.	irr.	12		Fongwhang Group (Bullock Harb.) China W.C.	8 30	17	
Fannings Id., S. Pacific		4		Forcados River, Bight of Benin.	4 22	5	
Fanny Hole, Mulroy Bay, Ireland.	6 17	9½	8	Forecarraeh R., Africa, W.C.	7 40	11	
Fansiak Channel, Canton R., China, E. Coast	1 0	7½	5	Formby Point, England	10 35	28	
Farallon, South, California	10 37	4½	3½	Formosa Mt., Malacca Str.	8 0	11	8
Fareham (close to the Upper Quay), England.	11 48	11½	8½	Fort Dauphin, St. Domingo	7 0	5½	3
Bridge, England.	11 51	7½	4½	Fortune Bay, Patagonia, W. Coast.	0 50	7	
Farewell, Cape, New Zealand.	9 20	14	10	Forward Harb., British Columbia.	3 0	16	11
Fatsizio, Japan Sea	6 0	5		Foulness, Crouch River, England.	12 5	14½	10
Fayal, Azores, Atlantic Ocean.	11 45	4		Fowey, England	5 14	15	11
Fear, Cape, River, United States.	7 19	5½	4½	Fowlers B., Australia, S.C.	10 30	6	
Fécamp, France	10 44	23½	18	Fox Bay, Falkland Ids.	7 0	6	
Fenit, Tralee Bay, Ireland	4 3	12½	9½	Foyle Lough (Warrenpoint), Ireland.	6 20	6½	5
Feolin Ferry, Jura	4 41	6½	4½	Foynes Island, Ireland	5 35	15½	12
Fernandina, Clinch Fort, United States.	7 53	6½	6½	France, Port de, New Caledonia.	8 25	4	
Fernando Noronha Island, S. Atlantic.	4 0	6		Francis, St., Bay, Tierra del Fuego.	4 0		
Fernando Po, Bight of Biafra.	4 0	7		Francisco, San (North Beach), California.	12 6	4½	3½
Ferro, Canary Ids.	12 30?	9?		Fraser River (entrance), British Columbia.	6 30	7-10	
Ferrol, Spain	3 0	15		Fraserburgh, Scotland	0 40	11	8½
Ferry Side, South Wales	5 49	23	16½	Frechette Id., River St. Lawrence.	8 0	14	9
Filey Bay, England	4 20	16	12½	Frederick Reef, Australia, E. Coast.	8 0	6	
Finisterre, Cape, Spain	3 0			Frederickshaab, Greenland.	6 3	12½	9½
Fish Hd., G. Manan, Bay of Fundy.	11 16	22½	18½	Freycinet Estuary	4 15	3½	
Fishguard, Wales	6 56	11½	8½	Reach, Sharks Bay, Australia N.W. Coast.	3 0	5	
Fitz-Roy Id., Australia, E. Coast.	9 15	7-12					
Fitzroy Port, Falkland I.	4 45	6					

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ostadt, Denmark	2 37	9		Gibraltar (old Mole)	2 20	3½	
o, Brazil -	2 40	4½		Spain.			
Cape, Magellan	1 0			Gigha Sound, Scotland -	2 22	4	2½
				Gijon Bay, Spain, N. Cst.	3 15	15	
ord, Faroe Ids.	11 15	6½	4½	Gilmorris Id., Africa, W.	6 0	11	
Bay, Madeira -	12 48	7		Coast.			
Newfoundland	7 0?	2-3?		Gizree Bunder, Indus,	9 50	7	
Patagonia, W.C.	1 15			Hindoostan, W. Coast.			
bour, Tierra del	2 30	4		Glasgow, Scotland -	1 25	9	7½
				Port, Scotland -	0 18	9	
Tierra del Fuego	2 30	4		Glenan Iles, France -	3 12	13	10
l Hecla Strait,	7 0	8		Glennie Ids., Bass Strait	12 20		
Regions.				Gloucester Cape, Tierra	1 30	5	
l., Africa, W.C.	5 30	3		del Fuego.			
ay, Hainan Id.,		4-5		Harbour, Uni-	11 4	10½	8½
Sea.				ted States.			
ort, Magellan Str.	9 0	5½		Gluckstadt, Germany -	3 9	10	
inte de, Ceylon,	2 0	2		Goa, Hindoostan, W.C. -	11 30	6	
st.				Godbout River, Gulf St.	1 52	11	6
Port, Patagonia,	8 50	46		Lawrence.			
st.				Goeree (West Gat) -	1 45	7	
l., Africa, W. C.	6 45	4		Gollonsir Socotra, Ind.	7 20	8	
(Mull of) -	11 15	15?	12?	Ocean.			
Ireland -	4 35	14½	11	Golovnin Bay, America,	6 23	3½	
l, G. of Mexico		1½	¾	N. W. Coast.			
l., Africa, W.C.	8 10	6-9		Gomera, Canary Ids. -	12 45?	9?	
Ids., Australia,	1 50	3		Gometra, Loch Tuadh,	5 29	11½	8
st.				I. of Mull.			
wn, Scotland,		17	12	Gonaives Bay, St. Domingo	8 0	1	
ast.				Goods Bay, Patagonia, W.	0 30	7	
Head -	11 49	10		Coast.			
basin, Gulf St.	2 40	5	3	Good Hope, Cape of,	9 0		
nce.				China, E. Coast.			
d, United States	7 37	7		Good News, B. America,	6 15	13½	
hou Id., Gilolo		5		N. W. Coast.			
e, Moluccas.				Good Success Bay, Tierra	4 3	6-8	
Harbour, Aus-	2 50	2½		del Fuego.			
S. Coast.				Goold Island, Australia,	6 45	6	
ape, Nova Scotia	9 15	4	2	E. Coast.			
d'Elmina, St.	4 30	6		Gooriya Creek (entrance),	11 0	9	
W. Coast.				Hindoostan, W. Coast.			
ort, B. of Fundy	11 17	32	28	Goose Cove, Newfound-	7 0?	2-3?	
St., Basin, Aus-	12 15	25		land.			
N. W. Coast.				Gorda Sound, Virgin	8 30	1½	
boals, United	10 30	7		Islands.			
				Gore Port, New Zealand	9 0	8	6
Bay, Tasmania	9 42	3	2	Gorée, Africa, W. Coast	7 45	2½	
St., Sound, G.	1 31	1½	1½	Goree Road, Tierra del	4 0	8	
xico, Mid en-				Fuego.			
				Goulburn Ids., Australia,	6 0		
West entrance	irr.	2½-4		N. Coast.			
wn, United States	8 40	4½	3½	Goury, France -	7 6	22	17½
South Island,	7 56	4½	3½	Gowlland Harbour, Dis-	5 30	11	
States.				covery Passage, Van-			
Harbour, Hin-	2 40	9		couver Id.			
l, W. Coast.				Gracias, Cape, Harbour,	10 30	2	
St., France -	6 20	34	25	Bay of Honduras.			
Ne, Socotra,	7 0	7		Grand Cestos, Africa,	5 20	4	
Ocean.				W. Coast.			
Hashish, Arabia,	10 0	10		Harb., Gd. Manan,	11 7	21	17½
oast.				Bay of Fundy.			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Grand Lahou, Africa, W. Coast.	4 20	4		Guinchos Kay, Bahamas	7 40	3	
Grand Passage, B. of Fundy.	10 43	20 $\frac{3}{4}$	17	Gun Cay, Bahamas	8 30	3	
Grand Port, Mauritius	1 0	1 $\frac{1}{2}$		Gundavee R. (entrance), Hindoostan, W. Coast.	2 0	19	
— Rustico, Prince Edward Island.	6 40	4	2	Gunfleet Sand, England - Gutzlaff Id., China, E. C.	11 40	12	8
Grande-digue, Madame I., Cape Breton Id.	7 55	6 $\frac{1}{4}$	4 $\frac{1}{2}$	Guysborough, Nova Scotia.	11 30	15	
Grande Point, Chile	9 45	5		Gweedore (Bunbeg), Ireland.	8 20	6 $\frac{1}{2}$	4 $\frac{1}{2}$
Granton Pier, Scotland	2 20	16	12 $\frac{1}{2}$	Haarlem, Netherlands	5 32	11	8
Granville, France	6 13	37	27 $\frac{1}{4}$	Habitat Id., Lapland	9 0		
Gravelines, France	12 0	19	15	Habitat Id., Lapland	7 9	9	
Graves Port, Howe Sound, Gulf of Georgia,* British Columbia.	noon	12		Habitants Harb., C. Breton, Id.	8 20	6 $\frac{1}{2}$	4 $\frac{1}{2}$
Gravesend, England	1 10	17 $\frac{1}{2}$	14	Haimun Bay, China, E. Coast.	9 0		
Great Barrier, Id. (Nagle Cove), New Zealand.	6 25	10	7	Haïti Cape, St. Domingo	6 0	3	
Great Barrier Reef, Australia, E. Coast.	8 48	7		Haiyun-tau, (Thornton Haven), Yellow Sea.	9 30	12	8
Great Fish Bay, Africa, W. Coast.	2 30	5-6?		Hakluyt Head, Nova Zembla.	1 30	4	
Great St. Lawrence Harb., Newfoundland.	8 30	7	4	Hakodadi Harb., Yezo Island, Japan.	5 0	3	
Greatman Bay, Ireland	4 39	15 $\frac{1}{2}$	11 $\frac{1}{2}$	Halifax, Nova Scotia	7 49	6	5
Green Island, River, St. Lawrence.	2 45	16	9 $\frac{1}{2}$	Halt Bay, Patagonia, W. Coast.	0 30	8	
Greencastle Point, Ireland.	11 2	14	11 $\frac{1}{2}$	Hamburg, Germany	5 29	6 $\frac{1}{2}$	
Greenock, Scotland	12 8	9 $\frac{1}{4}$	8 $\frac{1}{4}$	Hamilton Port (Korea), Yellow Sea.	8 30	11	
Greenwich, England	1 43	19	15	Hammelin Pool, Sharks Bay, Australia, N.W. Coast.	5 0	3 $\frac{1}{2}$	
Gregory Bay, Magellan Strait.	9 45	23		Hammerfest, Norway	1 10	9	
Grenada (St. George Harb.), Caribbee Ids.	2 40	1 $\frac{1}{2}$	$\frac{3}{4}$	Hammond Knoll, England, E. Coast.	7 40		
Grenadines, Caribbee Ids.	3 0	1 $\frac{1}{2}$	1	Hang-chu Bay (Sesham Ids.), China, E. Coast.	11 45	14	
Grey Port, Swan River, Australia, W. Coast.	9 0	1-1 $\frac{1}{2}$		— (Fog Ids.)	11 45	17	
Greytown, Mosquito Cst.	9 0	1 $\frac{1}{2}$		— (Chapoo Rd.)	12 0	25	
Gribanika Pt. White Sea	4 50	3		— off Can-pu		32	
Griffith I., Barrow Strait	12 15	3 $\frac{3}{4}$	2 $\frac{3}{4}$	Hanover Sound, Bahamas	8 15	4	3
Griguet Bays, Newfoundland.	7 0?	2-3?		Harbour of Mercy, Magellan Strait.	1 22	4	
Grimsby, England	5 36	19 $\frac{1}{2}$	15	Harbour Grace, Newfoundland.	7 30?	7?	
Grindstone Island, Bay of Fundy.	11 47	41	34 $\frac{1}{2}$	Harbour Id., Nova Scotia	7 40	6 $\frac{1}{2}$	4 $\frac{1}{2}$
Grisnez Cape, France	11 27	21 $\frac{1}{2}$	16 $\frac{1}{2}$	Hardy Port, New Zealand	9 55	8	6
Grondine, R. St. Lawrence	9 0	9	6	Haro Strait (Channels leading to, from St. Juan de Fuca Strait).	irr.	10-12	
Guambacho Bay, Peru	6 30	2		Harrington Port, England	11 5	26	19
Guardafui Cape, Africa, E. Coast.	6 15	6		Hartlepool, England	3 28	15	11 $\frac{1}{2}$
Guarmey Bay, Peru	6 10	2		Harvey Pnt. (Call Creek), Vancouver Id.	0 30	10	
Guatuleco, Mexico, W. C.	1 30	5		Harwich, England	12 6	11 $\frac{1}{2}$	9 $\frac{1}{2}$
Guayaquil, Ecuador	7 0	11		Hastings, England	10 53	24	17 $\frac{1}{2}$
Guaymas, Mexico, W. C.	8 0	4		— Harbour, Bay of Bengal, E. Coast.	10 40	13 $\frac{1}{2}$	
Guernsey, (St. Peter Port), English Channel.	6 37	26	18 $\frac{1}{2}$	Hatteras Inlet, United S.	7 4	2 $\frac{1}{2}$	2
Guia Narrows, Patagonia, W. Coast.	2 10			Haute Isle, Bay of Fundy	11 21	33	28 $\frac{1}{2}$

\* From observations made in the month of October.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Cuba - - -	8 14	3		Hobarton, Tasmania -	8 15	4½	3½
h Harb., Sand-	7 15	4		Hoe-e-tow Bay, China, E.	12 15	16	
d., Banks Ids.				Coast.			
dwest, Wales -	6 42	7½	2½	Hokianga R. (entrance),	9 45	10	
rance - - -	9 51	22	18	New Zealand.			
k, New Zealand	7 50	3		Hokianga R. (Kokohu)	10 15	10	7
ights, France -	5 45	31	23½	New Zealand.			
ou Pholo Atoll,	9 30	5		Hollesley, England -	11 30	8?	6?
res.				Holmes Hole, United	11 43	1½	1½
y, Japan Sea -		5½		States.			
st., Bay, Africa,	2 30			Holsteinborg, Greenland	6 30	10	
ast.				Holy Island, England -	2 30	15	11½
-Id., S. Atlantic	3 11	3		Holyhead, Wales -	10 11	16	12½
- St. Sound, U. S.	7 8	7½	6	Hon-cohe Bay, China	11 30	5	
England -	4 43	15½	11½	Sea, W. Coast.			
d, German Ocean	11 33	9½	7	Hondenklip Bay Africa,	2 30	5½	
Jersey, English	6 25	30½	21½	S. W. Coast.			
el.				Honfleur, France -	9 29	23½	18
te Approaches,				Honghai B., China, E. C.	10 0	6½	
States.				Honoruru, Sandwich Ids.	4 0	2	
— Long Id.,	9 59	6	5½	Hongkong, China, E. C.	10 15	4½	
wells Dock).				Hoogly R., (W. entrance),	10 0	10½	
— N. of Astoria	9 48	6½	5½	Bay of Bengal, W. C.			
				Hooper Island, Korea,	9 10	11½	8½
— Pot Cove,	10 48	8½	6½	S. Coast			
part).				Hope Harb., Falkland Ids.	8 10	7	
— Wards Id.,	10 9	6½	5	— Sound (Mia-u-tau	10 24	6½	
rs Dock).				Group), Yellow Sea.			
sluis, Nether-	2 30	8	6	Horn Cape, Tierra del	4 40	9	
				Fuego.			
Cape, United	8 0	4½		Horn or Blaavand Point,	1 44	5	
				Jutland.			
pe, United States	7 40	4		Horton Bluff, B. of Fundy	12 30	48	40
Port, Patagonia,	12 0	5		Hougue La, France -	8 42	18½	14½
ast.				Hourdel, France -	11 26	27½	21
o Inlet, Strait of	6 0	13		Hout B., Africa, W. Cst.	2 20	5	
a, B. Columbia.				Houtman Rocks, Aus-	11 30	2½	
let, Capricorn	9 0	10		tralia, N W Coast.			
Australia, E. C.				Howden, R. Tyne, Eng-		12	
a Port, Chile -	9 8	5		land.			
- Nicoya Gulf -	3 9	10		Howe, West Cape, Aus-	9 0	6	
Harbour, Van-	12 0	12		tralia, S. Coast.			
Id.				Howth Harbour, Ireland	11 9	13	10
Bay, Tierra del	0 30	6½		Huacho Bay, Peru -	4 45	3	
				Huafo Islands Patagonia,	12 0	7	
re, Blackwater,	12 20	12	8	W. Coast.			
England.				Huapilinao Hd., Pata-	1 25	15½	
hin Bay, China,	7 0			gonia, W. Coast.			
st.				Huasco Port, Chile -	8 30	6	4
iy, New Zealand	9 0	7		Huillard Inlet, Patagonia,	0 48	16-20	
Jutland -	2 45	5		W. Coast			
Cape May,	8 33	6½	5½	Hu-i-tau Bay, China, E.	12 15	16	
States.				Coast.			
ugh Bay, Prince	10 45	9½	7	Hukkar R. (entrance),	10 30	11	
Edward Id.				Hindoostan, W. Coast.			
Island New	11 32	3½		Hull, England -	6 29	20½	16½
Bonin Islands.				— Bridge, Crouch R.,	12 25	16	11
Firth, Shetland	9 45	6½	5	England.			
ead, United States	7 19	7½	6½	Hulu Shan B., Yellow Sea	2 30	8	6
, Jutland -	4 28	1		Humboldt Bay, California	12 2	5½	4½



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs	Neaps.			Springs	N
	h. m.	ft.	ft.		h. m.	ft.	
Hunter Id., Bass Strait -	11 30	8		James Id., W. end, Galapagos.	3 10	5	
Port, Australia, E. Coast.	9 45	6-7		R. (City Point) U.S.	2 11	3	
Hurst (Camber), England	{ 10 0 12 0 }	7½	6	Jashk Shoal, Persian Gulf.	9 30	8	
Husum, Denmark -	2 36	9		Jask Cape, Persian Gulf	6 0	6	
Hyannis, United States -	12 22	4	3	Jebogue, Bay of Fundy -	10 4	15	1
Ichabo Id., Africa, W. C.	1 0	6	4	Jedore, Nova Scotia -	7 45	6½	
Ilfracombe, England -	5 42	27½	21½	Jekatarina Ids., Lapland	6 23	10	
Iki, Japan Sea -	-	8		Jerba, Mediterranean -	3 10	7	
Ilha Grande, Brazil -	12 30	5	4	Jericoacoara, Brazil -	11 30	12	
Ilheo, Port d', Africa, W. Coast.	3 0	8-10		Jersey (St. Helier), English Channel.	6 25	30½	4
Iliolo Port, Filipinas -	12 0	5½		(Rosel) -	6 15	30	1
Inagua, Bahamas -	8 0	3½	2½	Jervis Bay, Australia, E. Coast.	6 20	6-9	
Indefatigable Id., Galapagos.	1 56	6		Jezirat Arabi, Persian G.	6 30?		
Indian Cay, Florida -	8 23	2½	1½	Hamar-al-nafur,	9 30	10	
Indus (Gizree Bunder), Hindoostan, W. Coast.	9 50	7		Arabia, S.E. Coast.			
Inhambane R., Africa, E.C.	4 15	10		Jún Persian Gulf	11 30	10	
Inishbofin, Ireland -	4 34	12½	9½	Kabr " -		8½	
Inishkeel, Ireland -	5 10	11	8	Kais " -	0 45	7½	
Inishturk, Ireland, W. Coast.	4 36	12½	9½	Kharg or Káreg " -	8 0	6½	
Inkanskie, White Sea -	9 15	14		Larek " -	10 15		
Inman Cape, Tierra del Fuego.	2 0	4		Tumb " -		8	
Intsi Point, White Sea -	11 55	16		Jiddah, Red Sea -		3	
Inverary, Scotland -	12 0	10		Jiginsk Id., White Sea -	5 15	4	
Inverness, Scotland -	12 18	12	9½	Joao San, Brazil -	6 24	14	
Investigator Rd., Australia, N. Coast.	8 0	9		Johanna Id., (anchorage)	3 40	11	
Iona Sound, Scotland -	5 11	11½	8½	Pomony Harb.,	4 0	11	
Ipswich, England -	12 35	13½		Comoro Ids.			
United States -	11 26	10½	8½	John St., Bay of Fundy -	11 21	27	
Iquique Road, Peru -	8 45	5		Newfoundland -	7 30	6	
Ireland Id., Bermudas -	7 4	4		River, Africa, S. Coast.	4 0	5	
Isidro St., Cape, Magellan Strait	1 0	8		River, U. S. -	7 28	5½	
Island Harbour, Choiseul Id., Falkland Islands.	5 20	6		Jonquiere Bay, Gulf of Tartary.	10 0	6	
Islay, Peru -	8 53	7		Joombas R., Africa, W.C.	8 10	6	
Isle-aux-Coudres, R. St. Lawrence.	4 25	17	10	Jooria, Hindoostan, W.C.	2 0	16	
Isles de Los, Africa, W. C.	6 35	13		Josef, San, Port, Patagonia, E. Coast.	10 0	30	
Isolette Cape, Arabia, S.E. Coast.	9 0	10		Jourimain Island, New Brunswick.	9 30	6	
Ives, St., England -	4 44	21	15	Juan de Nova, Madagascar		5	
Jacinto, Port San, Ticao Id. Filipinas.	6 30	6		Juan Fernandez I., Chile	9 30	4	
Jackson Port (N. Head), Australia.	8 15			Juan San, Porto Rico -	8 2	1½	
Jaemel, St. Domingo -	irr.	2-3?		San Port, Peru -	5 10	3	
Jaffrabat, Hindoostan, W. Coast.	11 35	9	7½	Juby Cape, Africa -		8	
James Id. (Adam Cove), Galapagos.	2 14	5		Judith Point, United States	7 32	3½	
N. side, Galapagos.	2 34	5		Jukan Ids., Lapland -	9 0	13	
				Julian, San, Port, Patagonia, E. Coast.	10 45	30	
				Julianshaab, Greenland -	5 6	7	
				Julien, St., Harbour, Newfoundland.	7 21 A.M. 6 30 P.M.	4½	
				Junk Fleet entrance, Canton River, China.	11 50	6½	
				Junk River, Africa, W. C.	5 45	5	
				Junkseylon Id. (E. Side), Malacca Strait.	10 0	11½	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Island, (Small Isles), Scotland.	5 3	3½	2½	Kilmichael Point, Ireland	8 30	4½	3
Lin Ferry "	4 41	6½	4½	Kilrush, Ireland	4 42	14	10½
Penin, New Zea-	5 30	8	6	Kincardine, Firth of Forth, Scotland.	2 53	17½	15
Harb. (entrance), Zealand.	10 55	10	8	King Id., Bass Strait	1 0		
aska, White Sea	6 50	7		King Port, Falkland Ids.	7 30	5	
oint, Banka Strait	8 17*	12½		Kingsbridge, England	5 46	10	
ksha, White Sea	3 25	7		Kingstown, Ireland	11 10	11	8½
n Cape, White Sea	11 54	15		Kinsale, Ireland	4 43	11½	9
land, New Zealand	9 0	6		Kinsiang Point, China, E. Coast.	7 0		
Harb. (entrance)	10 30	9½	6	Kircubbin, Ireland	12 42	11½	9½
ostan, W. Coast.				Kirindi, Ceylon	3 30		
Bay, Owyhee	3 49			Kirkcudbright, Scotland	11 10	23	
apan Sea	6 4	6½		Kirkwall, Orkneys	10 9	10	7½
, Netherlands	2 30	5	7	Kishm, see Kesm.			
id., New Zealand	6 30	10		Kiswara Harb., Africa, E. Coast.	4 30	12	
Harb., New Zea-	9 30	12		Kitnapatnam, Bay of Bengal, W. Coast.	11 0	1½	
				Klaskish Inlet, Vancouver Id.	12 0	12	
rry, Hindoostan	9 57	9		Knox Bay, Vancouver Id.	12 0	16	
rry, Ceylon	11 0			Koepang, Timor	11 0	9	6½
e, Bay of Bengal	11 30			Kokohu, New Zealand	10 15	10	7
Islands (Port e), Indian Ocean.	5 30	5		Ko-kun-to Group, Korea, W. C.	2 25	18	10
a B., G. St. Law-	10 45	5	3	Kok-si-kon Prt. Formosa)	11 30	3	
				China Sea, E. Coast.			
Harb. (Formosa),	10 30	3		Koombanah B., Australia, W. Coast.	9 0	½-3	
Sea, E. Coast.				Koree R. (Monda Point), Hindoostan, W. Coast.	11 40	11	
e R. (W. Cove),	3 52	10	7½	Kouloi River	1 15	20	
d.				Kou Zomen, White Sea	3 30	6	
reef, Australia, E.	8 0	5½		Kovda Bay, White Sea	3 25	6	
				Koweit, Persian Gulf	0 15	9	
ec River (Hanni-	11 15	9½	8	Krakatoa, Strait of Sunda	7 0	4	
Point), U.S.				Kuper Harbour, Korea, S. Coast.	9 28	11½	8½
land, Bass Strait	11 10			Port, America, N W. Coast.	1 40	13	10½
Knock, England	11 47			Kuriyán Muriyán Bay and Islands, Arabia, S.E. Coast.	8 20	6½	
Bay, Australia, E.	9 30	9-14		Kurrachee, see Karachi.			
				Kweshan Ids., China, E. Coast.	9 30	14	
White Sea	3 8	6		Kyem River, White Sea	5 23	4	
Point, White Sea	4 30	5½		Kykduin, Netherlands	7 0	12	
en Island, Indian	2 0	2		Kyle Akin, Loch Aish, Scotland.	6 16	15½	11
				Kyle Rhea, Scotland	6 0	15	11
Persian Gulf	11 0	12		Kyuquot Sound, Vancouver Id.	12 0	12	
Cove, United States	7 48	5	4½	Ia Poile Bay, Newfoundland.	9 0	6	-4
erámeh, Arabia, Coast.	9 30	10		Labuan Id., China Sea, E. Coast.	9 45	6	
Phyou Harbour, of Bengal.	10 0	9	6	Labyrinth Ids., Magellan Strait.	0 30	5½	
, Ireland							
it., Hebrides	4 16	13	9½				
Id., Lapland	5 30						
n Cove, Ireland	6 45	12					
Bay, Ireland	4 34	15½	11				
Bay, Arran Ids., Id.	5 22	10½	8				
olme (Humber England.	4 28	13½	10				
gs, Ireland	6 2	19½	15½				
gh, Ireland	5 16	11½	8½				
	12 40	11	9½				

\* In N.W. monsoon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Lacul Harb., St. Domingo	6 0½	3?		Lerwick, Shetland	10 30	6	4
Lady Bay, Australia, S. C.		4		L'Etang Harb., Bay of Fundy.	11 19	23½	20
Lady Elliot Islet, Australia, E. Coast.	9 0	7-8		Leubu River, Chile	10 30	5	
Lagos, Portugal	2 7	13		Leven Port, Madagascar	3 30	7½	
—River (Bar), Bight of Benin.	6 0	3		Levrier Bay Africa, W. Coast.	12 0	6-7	
Lagos River (Consulate Wharf.)		2		Lewis Cape, St. Labrador	6 30		
—(Palaver Ids.)		1		Liant Cape (G. of Siam), China Sea, W. Coast.	5 7	6½	
Laguimanoc Port, Luzon	1 30	5½		Liau Ho (Bar), Yellow Sea.	4 0	11½	7½
Laguna de Terminos, G. of Mexico.	noon.	1½		—(entrance)	5 0	12	
Lamalin, Newfoundland	9 15	8½		Liau-tung, Chingho, Yellow Sea.	1 20	6½	
Lambayeque Rd., Peru	4 0	3		—Gulf (Sand Point), Yellow Sea.	4 50	7	5½
Lamlash, Scotland	11 49	10	7	—N.W. Head of Gulf.	5 30	10	8½
Lamo Harb., Africa, E. Coast.	4 6	11		Limerick, Ireland	6 16	18½	13½
Lancaster, England	11 16	8½		Lindy River (entrance), Africa, E. Coast.	4 15	12	
Landshipping, Cleddau River, Wales.	6 27	20	14½	Lingeh, Persian Gulf	12 0?		
Langshan Crossing, Yang-tse-Kiang.*	1 40	12	8	Lintin Island, Canton R. China, E. Coast.	12 0	7½	
Lankeet Island, Canton River, China.	11 20	6½		Lisbon (Belem), Portugal	2 30	12	9
Lansew Bay, China, E. C.	10 0	13		Liscamor Bay, Ireland	4 23	13½	10
Lanzarote, Canary Ids.	1 0?	9?		Liscomb Harb., Nova Scotia	8 0	6½	4½
Laredo B, Magellan Strt.	11 30	9		Lishan Bay, China, E. C.	10 15	16	
Larga, Scotland	11 50	10		List, Denmark	2 21	6	
Latham Id., Africa, E. Cst.	4 0	10		Litau Bay, Yellow Sea	3 0	6	4
Latitude Bay, Tierra del Fuego.	2 5	4		Litke Ridge, White Sea	11 45	15	
Lau-mu ho, Yellow Sea	1 30	5		Little Egg Harbour, United States	7 10	4½	3½
Laun, Great and Little, Newfoundland.	8 15	7	4	Little Fish Bay, Africa, W. Coast.	2 30	5-6?	
Laura Harb., Tierra del Fuego.	1 0	6		Little Gull Island, U. S.	9 38	3	2½
Lavata Bay, Chile	9 20	5		Littlehampton, England	11 36	16	11½
Lawrence, Great St., Harb. Newfoundland.	8 30	7	4	Little Metis, G. St. Lawrence.	2 10	13	8
Le Have Cape, Nova Scotia.	7 48	7	5½	Little Milford Quay, River Cleddau, Wales.	6 31	19	13½
—Nova Scotia.	7 51	7½	6	Little Natashquan, G. St. Lawrence.	11 0	5	3
—Crooked Channel.	7 51	7	5½	Liverpool, England	11 23	26	20½
—Mothers Island	7 55	7½	6	—Bay, Nova Scotia.	7 50	8	5
—Getsons Cove	8 6	8	6½	Liza Bay, Lapland	5 58	9	
—Bridgewater (McKean's Wharf.)	7 54	7½	6	Lizard Id., Australia, E. Coast.	9 15	7-10	
—Lunenburg (Spidlers Cove.)	4 0	7		—Point, (Perran Vose Cove), England.	5 0	14½	10½
Le Maire Strait, Tierra del Fuego.	0 30	6½	4½	Llanelly (Bar), Wales	6 16	28	21
Leervig Fiord, Færø Ids.	2 17	16½	12½	Lloyd Port, Bonin Ids.	6 8	3	
Leith, Scotland	6 0			Loanda, San Paul de, Africa, W. Coast.	4 30	5	
Leman Shoal, England, E. Coast.	4 40	8		Lobah Point, Banka Strt.†	11 0†	10	
Lennox Cove, Tierra del Fuego.	12 6	6	4½	Lobito B., Africa, S.W. Coast.	2 20	5	
Leopold Port, Barrow Strt.	11 18	24½	21				
Lepreau, Bay of Fundy							

\* At the Langshan Crossing the tide rises for 3 hours only, and falls for 9 hours.—H.M.S. Actæon, 1861.

† In S.E. monsoon.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Point, Peru -	8 0			Louis Port, France -	3 11	13	9½
s Cay, Bahamas -	7 40	3		— Mauritius -	12 30	3	2½
s Head, Patagonia,	0 29			Louis, St., Bay, St. Do-	irr.	2-3?	
Coast.				mingo.			
Aline, Scotland -	5 33	13½	10½	Louisburg Harb., Cape	8 0	5	4
Alsh -	6 16	15½	11	Breton Id.			
Boisdale -	5 47	12½	9½	Low Bay, Falkland Ids.	5 0	5½	
Broom -	6 40	14½	10½	— Port, Patagonia, W.	0 40	7	
Carron -	6 29	16½	11½	Coast.			
Cuan -	5 36	13	9½	Lowestoft, England -	9 57	6½	5½
Duich -	6 0	15½	11	Luabo River (entrance),		22	
Dunvegan, -	6 7	15½	11	Africa, E. Coast.			
Eil (Head of Loch)	6 27			Lucas San, Bay, California	9 20	9½	
Eport -	6 6	12½	9½	Lucipara Pass, Banka	irr.	10	7½
Eriboll -	7 43	14½	11	Strait.			
Erisort -	6 43	15½	11½	Luis St., Texas, G. of		1¾	¾
Etive, Stonefield, -	7 3			Mexico.			
— Bunawe -	7 54	5½		Luis Obispo, San, California	10 8	4½	3½
Ewe -	6 39	14½	10½	Lunaire Bay, Newfound-	7 0?	2-3?	
Gail -	12 6	10	6	land.			
Houra -	5 45	13½	10½	Lundy Island, England -	5 15	27	20
Inver -	6 41	14	11	Lung-man Harbour,	10 0	7	
Laxford -	6 44	15	11½	Yellow Sea.			
Linnhe -	5 26	12½	8½	Lyme Regis, England -	6 21	11½	8½
Long -	12 6	12		Lymington England -	{ 10 25	} 8	6
Maddy -	6 6	12½	9½		{ 12 15		
Moidart -	5 44	13½	9½	Lynn Deep, England -	6 0	23	
Nevis -	5 47	14½	10	— Harbour -		18	
Roag -	6 11	11	8	— Road -		20	
Ryan -	11 12	11		Mabou River, C. Breton	9 0	4	
Skipport -	5 52	12½	9	Id.			
Strivan -	11 55	6		Macahé, Brazil -	2 30	9½	
Sunart -				Macao, China, E. Coast -	10 0	6½	
Tarbert, West, Har-	6 4	11½	8½	Macassar, Celebes -	4 40	5½	
Island, Scotland.				McDougall Harb., Africa,	2 30	5½	
Tarbert, East, Scot-	6 10	13½	10	S.W. Coast.			
d.				Maceio, Brazil -	4 30	8½	
Tongue -	7 53	15	12	Machias, Seal Id., Bay	11 5	18	14½
Torridon -	6 20	15	11	of Fundy.			
Tuadh -	5 29	11½	8	Macowa, Red Sea -	0 30	2	
en Ids., Norway -	12 0	9	7½	Macquarie Harbour,	7 30	3	
ia, Red Sea -	1 30	3		Tasmania.			
R. (St. Nazaire),	3 40	15½	11	— Port, Aus-	8 56	4-5	
ince.				tralia, E. Coast.			
s Point, Peru -	8 19	5		Macquereau P., G. St.	2 0	5	3
ock, (AmpanamB.),	8 0	6		Lawrence.			
ra Sea -				Madame Id., Madagascar	4 0	5	
on Bridge, England	2 7	19½	16½	Madoc Port, Wales -	7 30	17	
— Docks, England	1 57	19½	17	Madras Road, Coroman-	7 34	3½	
onderry, Ireland -	8 1	7½	5½	del Coast.			
(East), England -	5 26	16	13	Magadoxa, Africa, E. Cst.	4 30	8	
out Point, United S.	0 58	2	1½	Magdalen Ids., G. St.	8 20	3	2
s Cape, Africa -	4 30	4-6?		Lawrence.			
ent (Port Louis),	3 11	13	9½	Magdalena Sta., Island,	12 0	10	
ince.				Magellan Strait.			
Howe Island, S.	8 30	6		Magdalene B., California	7 35	6½	
ific.				Mahato Id., Africa, E. C.	4 30	7	
an-kan, Yellow Sea	4 30	11	9	Mahneah R., Africa, W.C.	7 40	11	
1 Larne, Ireland -	10 48	6½	6½	Mahone Bay, Nova Scotia	8 0	7	
— Rossmore, Ireland	5 20	11	8	Mahons R., United States	9 52	7	5½

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Maiden Rocks, Ireland, N.E. Coast.	10 43	6½	6½	Margate, England	11 40	15½	1
Majambo B., Madagascar	4 30	16		Maria Cape, Saghalin Id., Sea of Okhotsk.	2 0	5	
Makátein, Arabia, S.E. Coast.	9 0	6		Maria Sta., Id., Chile	10 20	6	
Makalleh, Arabia, S.E. Coast.	8 30	7		Maria Van Diemen Cape, New Zealand.	8 0	7	
Makumba R., Madagascar	4 45	17		Maristow, River Tavy, England.	5 47	8½	4
Makung Harb., Pescadres, China Sea.	10 30	9½	7	Marjoribanks Harbour, Korea, W. C.	3 30	29	
Malabrigo Port, Peru	5 0	2		Mark, St., Bay of, St. Domingo.	8 0?	1?	
Malacca Strait (light vessel one fathom bank).	6 0	15	12	Marka or Muerka, Africa, E. Coast.	4 30	8	
Malacca Strait (off Mount Formosa).	8 0	11	8½	Marks, St., United States	1 14	3	2½
—— Road, Malacca St.	7 30	11	8½	Maroni Bay, Comoro Ids.	4 53	10	
Malaga, Spain	12 0	3		—— River, Guayana	5 30	8	6
Malahide Inlet, Ireland	11 15	10	8	Martaban, Bay of Bengal	2 20	21	
Malcolm Atoll, Maldives	10 30	3		Martin, St., Cove, Tierra del Fuego.	3 30		
Maldon, Chelmer River, England.	12 32	10	6	—— C. Horn Ids., Tierra del Fuego.	3 50	8	
Malé, Maldives	12 30	3		Martin, St., de la Arena, Spain, N. Coast.	3 30	15	
Malludr Bay, Borneo	10 30	6-8		Martin Vas Rocks, South Atlantic.	3 45		
Malo, St., France	6 5	35	26	Martinique, Robert Harb. Carribean Sea.		4-5	
Malpelo Point, Peru	4 0	10		Mary, Cape St., Newfoundland.	8 30	7	5
Man-of-War Cay, Bahamas.	8 10	4		Mary St. Harb., Madagascar, E. Coast.	4 0	5	
Mana Island, New Zealand	7 0	8	6	—— Newfoundland	7 40	7½	5
Manama, Persian Gulf	5 20	7		Mary, Port St., I. of Man	11 10	20	16
Manawatu River, New Zealand.	10 0	8	6	—— St., Scilly Is.	4 27	16	12
Mancenilla Bay, St. Domingo.	7 0	4-5		Maryport, England	11 3	18	13
Mandavee Roads, Hindoostan, W. Coast.	11 50	15	11	Mascot, Persian Gulf	11 15	6	
Manicouagon River, R. St. Lawrence.	2 15	12	7	Mason B., New Zealand	11 10	8	6
Manila (Luzon Island), China Sea, E. Coast.	10 40	2½		Massacre Bay (Tasman corner), New Zealand.	8 45	13	9
Manning River, Australia E. Coast.	9 15	4		Massacre Bay, Motu Pipi River, New Zealand.	9 50	14	10
Manora P., Karachi, Hindoostan, W. Coast.	10 30	9½	6	Massowah, Red Sea	1 0	3	
Manorah R., Hindoostan, W. Coast.	1 30	16		Matan River, G. St. Lawrence.	2 15	11	7
Manta Port, Ecuador	3 4	6		Maule River, Chile	10 0		
Manukau Har. (entrance), New Zealand.	9 30	13	10	Maulmain, Bay of Bengal, Mauritius (Port Louis)	12 30	22	17
Manybranch Harb., Falkland Ids.	7 40	7½		—— (Grand Port)	1 0	3	2½
Maplin Light (Thames), England.	12 5	14½	10½	May Cape, United States	8 19	6	5
Maquereau Point, G. of St. Lawrence.	2 0	5	3	Mayday Bay, Palawan	9 55	3½	
Maranham, Brazil	7 0	16½	10½	Mayhé Id., Indian Ocean	4 0	6½	
Marblehead, United States	11 30	12		Mayotta Id., Mozambique	4 10	11½	
March Harb., Tierra del Fuego.	3 10	6		Mayumba, Africa, S.W.C.		7	
Marcouf, St., France	9 55	20		Mazambo Port, Madagascar.	4 30	15	
Mare Harb., Falkland Ids.	6 0	6		Mazatlan, Mexico, W. Cst.	9 40	7	
				Meichen Sound, China, E.C.	12 30	17	
				Melbourne, Australia, S.C.	1 20	3	
				Melinda P., Africa, E. C.	4 15	11	

	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
, Africa,	7 40	11		Minimegash, Prince Edward Island.	3 30	5	3
land Cay),	7 55	5-6		Minow Islands, Madagascar, W. Coast.	5 0	15	
. Coast.	6 1	18½	13¾	Minquiers Rocks, France	6 6	35	26
i -	3 40	15		Miramichi (Bar), Gulf St. Lawrence.	5 30	5	3
gonia, E.C.	7 50	3		Mira-por-vos, Bahamas -	9 30	3	2½
ock, Ba-				Mirs Bay (Tide Cove), China, E. Coast.	10 0	6½	
, C. Breton	8 15	5½		Miscou, G. of St. Lawrence.	2 30	5	3
Paknam),	5 7	9½		Mississippi, S. W. Pass, Gulf of Mexico.		1½	
V. Coast.	7 45	4	2¾	Mistanoque, Labrador -	10 30	6	3
ht, U.S. -	6 0	4		Mistley Quay, Stour R., England.	0 48	11½	
S.E. end,				Mobile, Gulf of Mexico	irr.	1-2	
, S.E. Cst.	9 0	6¾		Mocha Island, Chile -	10 30		
unks Land		2		Mocha Road, Red Sea, (E. Coast).	12 0	4½	
New Zea-	7 21	7	5	Mogador, Africa, W. Cst.	1 18	10-12	
of Bengal,	10 30	18		Molynaux Bay, New Zealand.	3 0	8	6
ova Scotia	10 6	5½	3½	Mombaza Port, Africa, E. Coast.	4 0	11	
indoostan,	11 0	7		Monach Ids., Scotland, W. Coast,	5 44	12½	8½
ce -	9 36	21	17½	Monckton (Railway), Bay of Fundy.	0 15	47	37½
ova Scotia	7 50	8	5	Mondego (Bar), Portugal	2 30	7	
gland -	5 4	15½	12	Monganui Harb., New Zealand.	8 15	9	7
t, Bolivia	10 32	3		Monomoy, United States	11 30	5½	4
Sea -	1 48	15-22		Monrovia, Africa, W. C.	6 0	6	
spot Bay),	10 35	6	4½	Montauk Pt., United States.	8 20	2½	2
roe Islands	3 12	6½		Monterey, California -	10 22	4½	3½
azores -	12 30	6		Montrose, Scotland -	1 25	13	10
our Port,	5 30	3		Monts, Point de, Gulf St. Lawrence.	12 0	12	6
ary.				Moreno (Constitucion Road), Peru.	10 0	4	
Tierra del	3 30			Moreton Bay, Australia, E. Coast.	9 30	3-7	
Patagonia,	12 0			Morewellham, R. Tamar, England.	6 12	10½	6½
, R. Tees,	3 55	13		Morjovets Id., White Sea	11 20	17	
Bight of	4 15	5		Morlaix Road, France -	4 53	24	18
1 (St. Ann	5 56	24	18	Morro (Sandy Pt.), Ecuador.	5 0	11	
, Wales.				Mossel B., Africa, S. Coast.	3 30	6	
, New Zea-	9 15	8	6	Moudinga Id., White Sea	5 50	3½	
land.	10 27	2¾		Mount Desert Island, United States.	11 10	13	
l, Palawan,				Mourondava, Madagascar, W. Coast.	4 45	12	
rae Island,	11 50	10	6	Mouton Port, Nova Scotia	7 54	7½	5½
ple Point),	10 45	19	14½	Moville, Ireland -	7 6	7½	5½
oast.							
ng Island),	12 0						
oast.							
ipinas -	7 0	6					
gland -	6 30	35	26½				
our, Gulf	1 16	6	4				
e.							
it. Lawrence	1 30	6	4				

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.
		Springs.	Neaps.			Springs.
	h. m.	ft.	ft.		h. m.	ft.
Mozambique Har., Africa, E. Coast.	4 15	12		Narrows (First), Magellan Strait.	9 0	36-42
Mucaras Reef, Bahamas	7 40	3		— (Second), Magellan Strait.	10 0	23
Muerka, <i>see</i> Marka.				Naruto (Fukura) Japan Sea.	6 17	7
Mugerus Harb., Bay of Honduras.	9 30	1½		Nash Point, Bristol Channel.	6 25	33
Mull of Cantyre, Scotland	10 35	4		Nasparto Inlet, Vancouver Id.	12 0	12
Mulroy Bay (Bar), Ireland	5 40	11½	8	Nassau, New Providence, Bahamas.	7 30	4
Mumbles Lt. House, Wales	6 1	27¼	20½	Nassau Bay, Tierra del Fuego.	4 0	6
Mungalaum Id., China Sea, E. Coast.	11 0	5		Natal Port, Africa, S. C.	4 30	6
Mungullo or Mongallo R., Africa, E. Coast.	4 45	12		Naturaliste Channel, Sharks Bay, Australia, N.W. Coast.	11 45	6
Murdounah Id. (E. Cst.), Red Sea.	6 0	3		Navallo Port, France -	3 42	13
Murray Islands, Torres Strait.	9 30	10		Nazaire, St., France -	3 40	13½
Murray Pass, Bass Strait	11 10	8		Naze, The, England -	12 6	12½
Musa Port, Babuyan Ids.		5		Nee-ah Harbour, Oregon	12 33	7½
Mutlah River, (entrance to Biddah River), Bay of Bengal, W. Coast.	10 0	14		Needles Point, England -	9 46	7½
Mutlah (Muda Kali), Bay of Bengal, West Coast.	11 45	15		Negapatam, B. of Bengal	5 0	3
Mutton Island, Ireland, W. Coast.	4 20	13½	9½	Negro Harbour, Nova Scotia.	8 12	7
Myggenæs Fiord, Færoe Islands.	9 0	9½	7½	Negro River, Patagonia	11 0	14
Naafe R., Bay of Bengal, E. Coast.	10 0			Nelson, New Zealand -	9 50	14
Naaloe Fiord, Færoe Islands.	4 0	6½	4½	Neuf Port, Gulf St. Lawrence.	2 10	13
Nafa-Kiang, Loo Choo Islands.	6 28	7		—, River St. Lawrence.	8 30	14
Nagasaki Bay, Japan Sea.	7 15	9	7½	Neville Port, Vancouver Id.	0 30	17
Nagore, Bay of Bengal, W. Coast.	8 15			New Bedford (entrance), United States.	7 57	4½
Namki Ids., China, East Coast.	8 30	17		— Castle, United States	11 53	7
Namoa Island (Clipper Road), China, E. Coast.	11 15	7		— Haven, United States	11 16	6½
Namquan Harb., China, E. Coast.	10 0	17		— London, United States.	9 28	3
Nanaimo Harb., Gulf of Georgia, Vancouver Id.	5 0	14		— Providence, S. W. Bay, Bahamas.	7 30	4
Nancowry Harb., Nicobar Islands.	9 15	8½		— Rochelle, United States.	11 22	8½
Nangamesie Harbour, Sumba.	11 30	17	13½	— Ross, Ireland -	6 4	12½
Nangka Id., Banks Strait		12		— Year Sound, Tierra del Fuego.	3 30	
Nanoose Harbour, Vancouver Id.	5 0	15		— York, United States	8 13	5½
Nansaree River (Bar), Hindoostan, W. Coast.	3 0	18		Newburyport, United States	11 22	9
Nantucket, United States	12 24	3½	3	Newcastle, Australia, E. Coast.	9 45	6-7
Napoleon Road, Gulf of Tartary.	2 30	2½		— England -	4 23	10½
Narrinda Bay, Madagascar, W. Coast.	4 30	15		— Ireland -	10 30	16
				Newhaven, England -	11 51	20
				Newport, United States -	7 45	4½
				— Wales, (South Coast.)	7 10	39
				— (W. C.)	7 0	12
				New Quay, Wales -	7 30	15
				Newton Stewart, Scotland, W. Coast.*	12 0	12

\* At Carty Quay.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
g Bay, China,	8 30	5½		Nyminde Gab, Jutland -	2 41	2	
ast.				Nysna Harbour, Africa,	3 45	5	
, St., Harb., G.	1 55	12	7	S. Coast.			
wrence.				Oban, Scotland - -	5 22	12	9½
— Port, Peru	5 15	3		Obb of Harris, Isle of	6 16	11½	8½
n Port (Lambton	4 30	5	3	Harris, Scotland.			
ur) New Zealand.				Observatory Id., China	11 0	5½	
Id. (Nancowry	9 15	8½		Sea, E. Coast.			
), Indian Ocean.				Ocracocke Inlet, United	7 4	2½	2
St., Bay, Ma-	2 6			States.			
Strait.				Octavia Bay, New	3 30	13	
Gulf (Port Her-	3 9	10		Granada.			
), Cent. America.				Oelar Cape, Banka Strait	6 30	12	
, Belgium -	12 18	16	13	Oho Sima, Loo Choo Ids.	7 30	5½	
iep, Netherlands	7 27	4	3½	Oibo Harb., Africa, E.C.	4 15	6	
iver (Nun en-	4 8	6		Olaveaga, Bilbao River,	3 15	12	
), Africa, W. Coast.				Spain.			
i Chan., White	5 25	3		Old Pt., Comfort, United	8 17	3	2½
				States.			
- Twr., White Sea	6 0	2		Old Providence, Bay of	irr.	1	
Sound, China,	10 30	20		Honduras.			
st.				Olenj Islands, Lapland -	7 30	12	
Group, China E.	10 0	5		Oleron, Ile d' France -	3 50	19	
				Omaider Island (Gulf of	6 0	4	
, Yellow Sea -	12 0	6		Akabab), Red Sea.			
u, Yung River,	1 0	9		Omersary R., Hindoostan,	1 45	18	
E. Coast.				W Coast.			
r, America, N.W.	6 0	18	15	Omonville, France -	7 29	15½	12½
				'Om-rasas-Masirah,	10 0	10	
island, Scotland	5 2	11½	7	Arabia, S.E. Coast.			
y of Fundy -	12 41	50½	43½	One Fathom Bank Light,	6 0	15	12
and, Tierra del	2 30	5		Malacca Strait.			
				Onega River, White Sea	9 17	6-7	
tier, France -	3 2	16	11½	Ooloogan Bay, China Sea,	9 30	5½	
Port, Africa,	2 30	5½		E. Coast.			
Coast.				Oonting Port, Loo Choo	6 35	8	
Sound, Vancou-	12 0	12		Islands.			
l.				Oösima, Japan Sea -	6 50	5	
y, Germany -	10 30	8		Oporto, Portugal - -	2 30	10	
gland -	12 30	15½	13	Orange B., T. del Fuego	3 30	5	
Island, S. Pacific	7 45	7		— Cape, Magellan Strt.	3 0		
pe, C. Breton Id.	8 0	4		Orford Haven (Bar), Eng-	11 30	7½	
— Edisto River,	7 10	7	5½	land.			
l States.				— Port, California -	11 26	6½	4½
harbour, New-	8 0	7½	5	— Quay, England -	12 30	7½	
and.				Orfordness, England -	11 15	8	6½
lands, Malacca	5 30	15	12	Orinoco River (entr.)	6 0	3	
				Guayana.			
nd, Madagascar	5 0	15		Orleans Id., R. St. Law-	5 40	17	13
mbila Harbour,	6 36	10		rence.			
d.				Ormond, Kenmare River,	3 43	10	7½
s Inlet, Van-	12 0	12		Ireland.			
Id.				Ornsay, I. of Skye -	5 50	14½	10½
Gulf, Patagonia,	7 0	10		Orlov Letni C., White	5 18	4	
st.				Sea.			
Port, Central	3 10	12		Os Ilheos, Brazil -	4 30		
ca.				Osaki, Japan Sea -	5 55	6½	
Port, Fijii Ids.	6 47	5½		Oscuro Cove, Patagonia,	0 55	20	
oa, Comoro Ids.	3 0	14		W. Coast.			
iver, Africa -	10 0	15	11½	Osprey Reef, Australia,	8 36	6	
				E. Coast.			



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Noaps.			Springs.	Noaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Ostend, Belgium -	12 25	19	15	Patteson Port, Vanu Lava Id., Banks Ids.	6 40	5	
Otago Har., New Zealand	2 50	7	5	Paul de Loanda, San, Africa, S.W. Coast.	4 30	5	
Otaheite, South Pacific -	noon	1½		Paul St. Id., Indian Ocean	11 0	3	
Otterswick, Orkneys -	9 13	11	8	— G. St. Lawrence	8 0	5	3
Otway Port Patagonia, W. Coast.	11 37	6		Paumben Pass, Bay of Bengal, W. Coast.	1 30	2	
Ou ou Kinsh Inlet, Vancouver Id.	12 0	12		Payta Port, Peru -	3 20	3	
Ounalashka Id., America, N.W. Coast.	7 30	7½		Peckett Har., Magin. Strt.	12 0	6	
Ouro R., Africa, W. Cst.	12 0	8-9		Pedro Gonzales, New Granada, (Trapichi Island).	3 50	16	
Ouse, R. (Goole), England	7 44	14		Pedro San., Pass, Patagonia, W. Coast.	0 30	9	
Ower Shoal, England, E.C.	6 30			— San Bay, California	9 39	4½	3
Oxbaasheia, Svec Fiord, Norway.	12 0	8		Peel, Isle of Man -	11 8	16½	13
Oyster Bay, United States	11 7	9½	8	Pegasus Port, New Zealand	11 50	8	6
Oystreham, France -	9 38	21	16	Peh-tang-ho, Yellow Sea	3 33	10	7½
Packsaddle Bay, Tierra del Fuego.	3 30	6		Pei-ho or Peking River (entrance), Yellow Sea.*	3 40	10	7½
Padstow, England -	5 13	20½	16½	— (Tien-tsin)	7 0	4½	
Pagham (entrance), England.	11 30	16½	12½	Pelew Islands, N. Pacific		6	
Paimpol, France -	6 0	31	23½	Pelican Lagoon, Kangaroo Id., Australia.	5 0	6	
Palais, Port le, Belle Ile, France.	3 18	14½	10½	Pelorus Sound, New Zealand.	9 35	11	7
Palliser Cape, New Zealand	6 0	6		Pemba Channel, Mozambique.	4 0	11	
Palma, Canary Ids. -	12 30?	9?		— Id., Mozambique	4 15	12	
Palmas Cape, Africa, W. Coast.	4 30	4		Pembroke Dockyard, Wales.	6 12	21	15½
Palmedo Road, Sumba Id.		15		Penang, Malacca Strait -	12 0	9	7½
Palmeira Point, Ceylon -	9 30	7-11		Peñas Cape, Tierra del Fuego.	6 2	12	
Paloan Bay, Mindoro -		5		Pender Harb., Strait of Georgia, B. Columbia.†	6 0	13	
Pamarung Ids., Borneo, E. Coast.		8-10		Peniche, Portugal -	1 54		
Pampang Bay, Java -		7-8		Penmark Rocks, France	3 16		
Panama Road, Central America.	3 23	15-22	10-16	Pennington R., Bight of Benin.	4 15	5	
Pancol, China Sea, E.C.	9 40	6		Pensacola, G. of Mexico		1½	
Pansand Hole, England -	12 0	15½	13	Pentillie, R. Tamar, England.	5 55	13½	9½
Paposo, Chile -	9 40	5		Pentland Firth, Stroma, S. Side.	9 47	9	6½
Paquique Cape, Bolivia -	9 45			— Swona, E. Side	10 24		
Para, Brazil, N. Coast -	12 0	11		— W. Side	9 35		
Parahiba, Brazil -	5 0	9-12		— Great Skerry, E. Side.	11 4	9½	6
Parenga-renga Harbour, New Zealand.	7 54	7		— W. Side	10 53		
Parida Id., New Granada	3 15	10½		Penzance, England -	4 30	16½	12½
Parsboro, Bay of Fundy	12 17	43	37½	Percy Isles, Middle or No. 1 Id.	10 30	16	13
Pasado Cape, Ecuador -	3 30	10		— South or No. 2 Islet, Australia, E. Coast.	10 30	14	
Pasages Port, Spain -	3 0	12	9	Perim Id., G. of Aden -	12 0	7	
Passage or Culebra P., Caribbean Sea.	9 0	1		Pernambuco, Brazil -	4 45	8-6	
— Id., Banda Sea -	noon	6		Peros Banhos, Indian Ocean.	1 30	5	
Passandava Bay, Madagascar, W. Coast.	5 0	15					
Patapasco R. (Bodkin Pt.) United States.	5 42	1½	1				
Patersons Inlet, New Zealand.	1 10	5	6				
Patrick Port, Scotland -	11 10	15	12				
Patta B., Africa, E. Cst.	4 30	10					

\* Time and rise much affected by winds.

† From observations made in the month of October.

	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
ait, Japan	10 30	6		Playa Marie Bay, Cali- fornia.	9 20?	7-9?	
arks Bay, W. Coast.	12 45	5½		Playa Parda Cove, Ma- gellan Strait.	1 8		
exico, W.	3 35			Pleasant Port, Falkland Islands.	5 0	6½	
(Makung a Sea.	10 30	9½	7	Plettenberg Bay, Africa, S. Coast.	3 10	6	
C. Breton	7 30	6	4	Ploughrescan, France -	5 17	25½	18½
., Prince	8 30	4	2½	Ploumanach, France -	5 15	24½	18½
land -	0 34	10½	8½	Plumper Cove, Howe Sound, G. of Georgia,	noon.	12	
l. of Fundy	10 41	22	18	British Columbia.*			
of Islands, id.	10 42	5½		Sound (Fane Id.), Vancouver Id.	irr.	12	
t. Francis	12 0	6		Plymouth Breakwater, England.	5 37	15½	11½
a, S. Coast.				(Sutton Pool)	5 32	15½	11½
Patagonia,	0 50	16		United States	11 19	11½	10½
				New, New	9 30	12	9
				Zealand.			
t, Wusung	0 35	13	8	Pomba B. Africa, E. Cst.	4 0	15	11
E. C.				Pomquet, Nova Scotia -	9 15	4	2½
J. States -	1 18	6¾	5½	Ponga River, Africa, W. Coast.	7 30	12	9½
side, Ma-	9 30	24		Poolbeg Lt. Hse., Ireland	11 12	12-14	9-11
Capel Bay,	2 30	3-4		Poole, England - -	{ 9 10 12 45 }	{ 6½ 14½ }	{ 4½ 10½ }
Coast.				Poolewe, Loch Ewe, Scotland.	6 39		
Entrance, Coast.	1 30	3-4		Pootoo Island, China, E. Coast.	8 15	12	
Lucenscliff	1 30	3		Poqueldon Harb., Pata- gonia, W. Coast.	0 54	18	
bson Bay, Coast.	3 0	3-4		Portaferry, Ireland -	12 0	18-21	12-16
(Cherry ted States.	10 5	2	2	Port-au-Choix, Newfound- land.	10 47	5	
ay, Chile -	9 20	5		Port au Prince, Saint Domingo.	8 0?	1?	
Nova Scotia	10 0	6	4	Port-en-Bessin, France -	8 57	20	15½
ombock -		10-12	21	Portchester, England -	11 46	13½	10½
England -	11 5	28	4½	Portendik, Africa, W. C.	10 0	6	
wfoundland	8 33	6½		Porth Cawl, Wales -	6 8	28½	21½
China Sea,		4		Porth-dyn-lleyn, Wales	8 30	16	
				Portishead, England -	7 16	41½	31
ellow Sea	11 45	8		Portland Inlet (Salmon Cove) America, N.W. Coast.	1 8	16	
, China, E.C.	8 30	17		United States	11 25	10	8½
gellan Strt.	1 0			Bay, Australia,	Midnight.	4	
Tasmania -	1 0	6		S. Coast.			
. Lawrence	5 0	17	10	Breakwater, England.	7 1	6½	4½
., Africa,	4 30	12		Porto Frio, Brazil -	2 40	4½	
ew Granada	3 15	14		Porto Praya, C. Verde Ids.	6 0?	5	
ell River,	12 20	12		Portree, Isle of Skye -	6 32	15	10½
				Portrieux, France -	6 0	31	23½
ort, Babu-	6 0	6		Portsbridge (Portsmouth) England.	11 48	6½†	4
ru -	4 50	4		Portsmouth Dockyard, England.	11 41	12½	10
Patagonia,	12 23	10					
stan, W. C.	10 5	9					
wfoundland	9 15	8					
a, Cuba -	7 31	2½					

Observations made in the month of October.

† Above the bed of the lake.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Portsmouth, United States	11 23	10	8½	Puna Island, Ecuador -	6 0	11	
Possession Bay, Magellan Strait.	9 0	36-42		Pwlheli, Wales -	7 46	13½	9½
— Cape, Torres Strait.	9 0	6		Quaco, Bay of Fundy -	11 35	30	25
— Id., Torres St.	1 0	9½		Quatsino Sound, Vancouver Id.	11 0	11	
Post Office Island (Charles Island), Galapagos.	2 10	6		Quebec, R. St. Lawrence	6 38	18	13
— Id., Torres Str.	1 0	9½		Queda, Malacca Strait -	12 0	5½	
Pouinipet Island, Caroline Islands, N. Pacific.	6 0	4½		Queen Charlotte Id. (entrance), New Zealand.	8 50	8	6
Poulamente B., Madame Id., C. Breton Id.	7 50	6	4	Queensferry, Firth of Forth, Scotland.	2 37	18	14
Poulton-le Sands, England	11 26	27½	21½	Queenstown, Ireland -	5 1	11½	9
Poverty Bay, New Zealand	6 5	6		Quelan Cove, Patagonia, W. Coast.	0 28		
Pratas Shoal, China Sea	4 0	5		Quentin, Port San, California.	9 5	9	
Preservation Inlet, New Zealand.	11 20	8	6	Quicavi Bluff, Patagonia, W. Coast.	0 57	20	
Preston, England -	11 49	10	4½	Quicks Hole (S. side), U.S.	7 36	3½	3½
Prince Frederick Harb., Australia, N.W. Cst.	12 0	28		— (N. side) -	7 31	4½	3
Prince of Wales Strait, Banks Land.		3		Quilca River, Peru -	8 0	6	
Princes Id., Bight of Biafra	3 45	4½		Quillimane R. (entrance), Africa, E. Coast.	4 15	16	
Princess Royal Harbour, Australia, S. Coast	11 56	1-4		Quilleboeuf, France -	10 6	9½	7½
Prony Bay, New Caledonia.				Quiloa, Africa, E. Coast	4 45	12	
Provincetown, U. S. -	11 22	10½	9½	Quoile Quay, Strangford, Ireland.	12 45	11	9½
Pubnico (Beach Point), Bay of Fundy.	9 25	12	10	Rabat, Africa, W. Coast	1 46	9-12	
Puerto Bueno, Patagonia, W. Coast.	1 40			Race, Cape, Newfoundland.	7 0	6½	5
Puerto de Baitiqueri, Cuba.	9 7	2½		Rachada Cape, Malacca St.	5 30	13	
Puerto de la Luz, Gran Canaria, Africa, W. Cst.	12 52	10		Radama Port, Madagascar, W. Coast.	4 40	13	
Puerto de Maravi, Cuba	7 56	2½		Ragged Id., Sumbawa, Java Sea.	8 10	3	
Puerto de Mata, Cuba -	6 49	2½		— Point, Borneo, E. Coast.		7	
Puerto de la Plata, St. Domingo.	7 30	3½		Raine Id., Torres Strait	8 10	10	
Puerto de Taco, Cuba -	8 49	2½		Rajahpoor Harb., Hindoostan, W. Coast.	11 0	12	
Puget Sound (Nisqually), America N.W. Coast.	6 0	18	15	Rajang River, Borneo -	4 45	13	9
Pugwash Har., Nova Scotia	10 30	7	4	Ramos R., Bight of Benin	4 20	5	
Pulaaki Fort, United States	7 20	8	7	Ramree Road, Bay of Bengal, E. Coast.	10 0	12	
Pulicat Shoals, Coromandel Coast.	9 25	2½		Ramsay Sound, Wales -	6 0	17	
Pulo Aor, Sumatra, N.E. Coast.		5		Ramsey, Isle of Man -	11 12	19½	16
Pulo Condore, China Sea, West Coast.*	2 30	6½		Ramsgate, England -	11 44	15	12
Pulo Leat, Gaspar Strait	2 30	4		Ramso Fiord, Norway -	10 45	7	
Pulo Mendanao, Gaspar Strait.	2 30	4		Rangoon, Bay of Bengal, E. Coast.	5 30	21	14
Pulo Panjang, G. of Siam	7 0	2		— R. (entrance) B. of Bengal, E. Coast.	3 15	21	14
Pulo Timooan (W. side), China Sea, W. Coast.	6 0	7½		Raoul or Sunday Island, S. Pacific.	6 0	5	
Puluqui Id., Patagonia, W. Coast.	1 5			Rappahannock (Saunders Wharf), United States.	3 2	2½	2
				Rás Hafún, Africa, E. C.	6 15	4	
				Rás Jerdafoon. See Guardafui Cape.			
				Rás Mohommed (Gulf of Akabah), Red Sea.	6 0	5	

\* From a French survey, 1862.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
mah, Arabia,	9 0	8		Rivadeo, Spain, N. Coast	3 0	15	
ast.				Rivoli B., Australia, S.C.	10 0	4	
eimch, Persian	11 45	7		Rocas, As, Atlantic	5 15	10	
				Roche Cape, R. St. Lawrence	9 30	6	4
idah } Arabia {	8 30	5½		Rocheport, France	4 6	17	13
li } S. E. {	10 0	10		Rochelle, France	3 31	17	13
d } Coast {	9 30	9		Rockport, United States	10 57	10½	8
n, Ireland	5 42	12½	9	Rockall, N. Atlantic	3 30	12	
(G. of Cambay),	2 15	18	13	Rocky Id., G. of Siam	4 0	4	
stan, W. Coast.				Rodrigue Id., Ind. Ocean	1 45	6	
Cent. America	3 6	11		Romania Point (Malay	10 30		
Inlet, Pata-	0 44	14		Penin.), China Sea,			
V. Coast.				W. Coast.			
Ceylon, South	2 20	2½		Romdals Ids., Norway	10 45	6	
(Pier), Ireland	10 31	4	4	Rona (South) Light,	6 20	14½	10½
Labrador	7 45	3½	1½	Scotland.			
urian Strait	5 0	10½		Roodewall Bay, Africa,	2 30	6½	
, England	10 42	8½	6	S.W. Coast.			
ve, Bass Strait	12 57			Roque, Cape St., Brazils		10	8
, France	12 5			Roscoff, France	4 46	23	17½
, Iceland	6 20	35	26	Rosel, Jersey, English	6 15	30	21½
s Id., Borneo,	5 0	17½	13½	Channel.			
ast.		8		Roshnoff Cape, America,	7 30	15	
, Denmark	7 42	4		N.W. Coast.			
i. Clyde, Scot-	1 15	9		Rota, Spain	1 24	12½	8
				Rotterdam, Netherlands	3 45	7	
				Rouen, France	2 28		
B., Marquesas	2 30	4		Rouge Harbour, New-	7 0?	2-4?	
ort, Tanna Id.	5 35	3		foundland.			
, { (St. Pierre)	noon.	3½		Roundstone, Ireland	4 28	13½	10½
, { (St. Denis)	0 22	2½		Revama River, Africa,	4 0	16	11½
, { (St. Gilles)	1 0	2½		E. Coast.			
, { (St. Paul)	1 7	4		Royal Harbour, Ruatan,	7 45	3½	
, Fiji Islands.				Bay of Honduras.			
lau Port.				Royal Island, Bahamas	7 45	3½	
Strait	10 0	7	5	Royal Port, Jamaica	11 0	1	
hthouse, Eng-	10 51	24	17	Royalist Port, Palawan,	11 0?	6½?	
				E. C.			
R., Gulf St.	3 30	4	2½	Royan, France	3 38	13½	10
United States	4 28	3½	2½	Ruapuke Id. (Foveaux St.)	1 0	8	6
Harb., Prince	6 0	3	2	New Zealand.			
Island.				Rugged Id., Bahamas	8 0	3	
Australia, E.C.	9 20			— Nova Scotia	7 59	7½	6
Plata, Cape	8 30	2		Ruggles B., Falkland Ids.	7 30	5	
*				Rush Port, Ireland	6 8	5½	3½
— Buenos	12 0	3-5		Rutland Id., Ireland, W.	5 22	11	8
— Barragan	7 0	5-9		Coast.			
America, E. C.				Ryde, England	11 20	13½	
de do Sul,		1½-2		Rye Bay, England	11 20	22	17½
, Brazil	3 0	4	3	Sabine Pass, G. of Mexico		1½	
, Patagonia,	11 0	14		Sable Cape (Clam Point),	8 27	8½	6½
				B. of Fundy.			
Africa, West	10 0	15	11½	— (Clarkes Harb.),	8 58	11	9
R., Campbell-	4 0	10	7	B. of Fundy.			
St. Lawrence.				Sable Island, N. side,	7 30	4	
				Nova Scotia.			
				Sable Island, S. side,	6 30	4	
				Nova Scotia.			
				Sables d'Olonne, Les,	3 26	14	10
				France.			

io de la Plata the rise is greatly influenced by the winds, the water being raised by S.E. pressed by those from N.W., causing at Buenos Ayres a difference sometimes of 12 feet.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Saboga, New Granada -	4 9	14		Sandy Hook, United States	7 29	5½	5
Sabon Id., Durian Strt. -		10		— Id., Madagascar, W.C.	5 0	15	
Sacred Bay, Newfoundland	7 23	2½		Sang-tau Bay, Yellow	0 55	7	4½
Sacrificios Pnt., Mexico,	3 15	6		Sea.			
W. Coast.				Sanguanga (entrance)	4 10	9	
Saddle Id., East, China,	11 0	14		Ecuador.			
E. Coast.				Sanguir Island, Moluccas		6	
Sado (Yebisu), Japan Sea	5 0	2		Sangwin R., Africa, W. Cst.	5 15	4	
Saguenay, Chicoutimi, G.	4 11	12	8	Sanmoon Bay (St. George	10 20	15	
St. Lawrence.				Island), China, E. Coast.			
Saguenay, Tadousac, G.	2 45	17	10	San-shui, Si Kiang, China,		5-6	
St. Lawrence.				E. Coast.			
Saigon (C. St. James) -	11 0	8		Santa Catalina Id., Cali-	9 35?	57	4?
— (Saigon City),	5 30	9½		fornia.			
Cochin China.				Santa Cruz R., Patagonia,	9 30	40	29
Saintes, Caribbean Sea -	6 45			E. Coast.			
Sal, C. Verde Ids., Africa,	7 45	5		Santa Cruz or Agadir,	12 45	9	
W. Coast.				Africa.			
Salango Id., Ecuador -	12 41	12		Santa Island, California	9 35?	57	4?
Salcombe, England -	5 41	15	11½	— Tenerife, Canary Is.	1 30	8	
Saldanha B., Africa, W.C.	2 0	6		Santa Maria Island, Chile	10 20	6	
Sale Macowa, Red Sea -	0 30	2		Santander, Spain -	3 30	15	12
Salem, United States -	11 13	10½	8	Santiago de Cuba, Cuba	8 33	2½	
Salm R., Africa, W. Cst.	8 10	6		Santona, Spain -	3 30	12½	10
Salmedina Rocks, Spain	1 27	12½	8	Saparooa Id., Moluccas -		6	
Salomon Ids., S. Pacific	6 45	2		Sapie Bay, Sumbawa -	1 0	10	
Saltash, R. Tamar, Eng-	5 45	15	11	Sarawak R. (Moratabas	4 0	9	3
land.				entr.)			
Salt Cay Anchorage,	8 15	4	3	— Santubong (entr.)	4 0	10	
Bahamas.				— Sarawak Junction	5 0	15-18	!
Saltees, St. George's	5 40			— City -	5 20	15-18	!
Channel.				Borneo, W. C.			
Salvador, San, Port, Falk-	8 10	8		Sarn Badrig or the	7 30	13	
land Islands.				Causeway, Wales.			
Samanco B., Peru -	6 30	2		Sarn-y-bwch Reef, Wales	7 40	14	
Sambilangs, Malacca St.		12	10½	Sau-o Bay, Formosa -	10 0	3½	
San Francisco (North	12 6	4½	3½	Saugor Id., B. of Bengal		12	
Beach), California.				Saumarez Reef, Australia,	8 0	6	
San Bartholomew Port,	9 10?	7-9?		E. Coast.			
California.				Savannah (city), U. S. -	8 13	7½	
San Blas, Mexico, W. C.	9 41	6½		— (entrance,) U.S.	7 20	8	
San Juan (anchorage),	9 40?	5		Scales Point, Blackwater	12 0	14½	1
California.				River, England.			
— del Sur, Cent-	3 8?	10?		Scalloway, Shetland -	9 30	5½	
ral America.				Scarborough, England -	4 11	15½	1
— River, New	6 0	12		Scarcies Rivers, Africa, W.C.	7 10	10	
Granada -				Scarnish, Tiree Id.,	5 31	11½	
San Lucar, Spain -	1 53	12½	8	Scotland.			
San Miguel, California -	9 25	5	4	Scilly (St. Agnes Id.) -	4 30	16	1
San Rosa Id., California	9 30?	5?	4?	— (St. Mary Id.),	4 27	16	1
Sand Cay, United States	8 40	2	1	England.			
Sandalwood Bay, Fijii Ids.	6 0	6?		— Trescow -	4 22	16½	1
Sand Point, G. of Liau-	4 50	7	5½	Sea Bear Bay, Patagonia,	12 45	20	
tung, Yellow Sea.				E. Coast.			
Sands Pnt., United States	11 13	9	7½	Seaforth Loch, Athline,	6 16	15	1
Sandwich Port, Malicolo	5 30	4		Scotland.			
Id., Banks Ids.				Seaham, England -	3 24	14½	1
Sandy Cape, Australia, E.C.	7 50	6-8		Seal Cove, Grand Manan,	10 54	20	1
— Cove, E. B. of Fundy	10 33	21½	17½	B. of Fundy.			
Sandy Cove, W., Bay of	10 47	23	19	Seal Id., C. Sable, Bay of	9 49	12½	1
Fundy.				Fundy.			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Bay, Mulroy	6 44	7½		Sheerness, England	0 37	16	13½
nd.				Sheet Harb., Nova Scotia	8 6	6½	4½
San, Brazil	2 0	4		Shefeen Island, Africa, S.C.	4 40	12	
Tierra del Fuego	7 0			Sheffield Island, U. States	10 58	8½	7½
Spain, N. Coast	3 0	12	9	Shelburne, Nova Scotia	8 4	7	5½
Bay,* Hin-				Sheldrake Island, Gulf	6 0	5	3
W. Coast.				St. Lawrence.			
Thina Sea, W.C.	9 44	7		Sherbro R., Africa, W.Cst.	6 0	11	
le, France	3 21	17½	12	Shields, North, England	3 23	13½	10
ay, Lapland	7 9	9		Shihtau Bay, Yellow Sea	1 30	9	7
l, England	11 45	16½	12½	Ship Harb., Nova Scotia	7 54	6½	4½
o Bay, Gulf of	2 0	12		(New Id.),	10 30		
, America,				Falkland Islands.			
oast.				Shippigan, Gulf St.	3 42	5½	3
3ar) - -	8 42	6		Lawrence.			
et N'dar) -	8 42	6		Shoal Bay, Australia, N.C.	6 0	18-25	14-20
. Louis), Africa,	10 0	6		E. Coast	8 30		
st.				Shoal Water B., Australia,	10 30	12-18	
Bank Mosquito		2		E. Coast.			
Bank, Mosquito	irr.	2		Shoreham, England	11 34	18	13½
				Shushartie Bay, Vancouver		12	
				Id.			
ands, Hang-chu	11 45	14		Si Kiang or West River,			
ina, E. Coast.				China, E. Coast:			
ortugal -	2 30	8	11½	" (San-shui) -			5-6
ver, (entrance,)	3 31	15		" (Shao-king) -			3
				" (Wuchan) -			1-1½
Archip. (Mayhé	4 0	6½		Siak River, Malacca Str.	9 0	12	
an Ocean).				— off the town -		11	
., Ladrone Ids.	6 45	2½		Sidmouth Cape, Australia,	9 15	10	
nds, Lapland -	8 20	12	5	E. Coast.			
— Bay, Gulf	1 40	9		Sierra Leone, Africa, W.C.	7 55	8	
rence.			8	Sillebar R. (Bar), Sumatra	6 0	4½	
n Banks (west	2 50	10		Simidsu, Japan Sea	7 30	7	
ellow Sea.				Simoda Port, Japan Sea	5 0	3-5	
lún, Arabia,	9 20	10		Simonoseki, Japan Sea	8 30	8	6
ast.				Simons Bay, Africa	2 44	5½	3½
ifeh, Arabia,	9 45	10		Simons St., Island, U.S.	7 43	8½	6½
ast.				Singapore, New Harbour,	9 45	10	7½
arb., Falkland	9 30	6		Malacca Strait.			
			7	Sinou, Africa, W. Coast -	5 0	4	
ang-tse-Kiang,	0 40	10		Sir C. Hardy Ids., Torres	9 15	10	
E. Coast.				Strait, E. Coast.			
Si Kiang,		3		Sir E. Pellew Islands,	7 30	4-7	
E. Coast.				Australia, N. Coast.			
rsian Gulf -	1 0	6		Sisal, Gulf of Mexico		2	
y, Naturaliste	11 45	6		Sitka, America, N.W.C.†	0 34	5-7	
				Skaapen Fiord, Færøe			
- Denham Sd.	12 5	5		Islands:			
- Freycinet	3 0	5		Between Stormoe and	5 0	9½	7½
				Sandoe.			
- Freycinet	4 15	3½		Between Hestoe and	5 30	9½	7½
				Sandoe.			
- Cape Perron	12 45	5½		Skagen or the Skaw,	5 56	1	
- Hamelin Pool	5 0	3½		Jutland.			
- Australia,				Skerry, Great, E. side,	11 4	9½	6
N.W. Coast				Pentland Firth.			
Harbour, New	1 0	4	2	Skerry, Great, W. side,	10 53		
ck.	8 0			Pentland Firth.			
n, Ireland -	5 32	11½	8½	Skerries, Ireland, N. Cst.	6 15	5	3

des rise a.m. 6 feet, p.m. 7½ feet from October to March; and the contrary during the rest of

at Sitka as given by Commander Pearce, H.M.S. Alert, in his remarks in 1860, does not t, but on the authority of Commander Pike, H.M.S. Devastation, (1862,) the local pilots say sometimes is as much as 16 feet.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Skerries, E. Coast. -	11 0	13	10	Stellacoom Fort, Oregon	4 46	11	9½
Skip Ness, Scotland -	11 50	9		Stephen Port, Australia,	9 0	6	
Skull, Ireland - -	4 2	9½	7½	E. Coast.			
Slaughden, Orford, Eng-	1 0	7½		Falkland	7 45	7½	
land.				Islands.			
Slievebane Bay Ireland,	5 49	10½	7½	Stewart Harbour, Tierra	2 50	4	
W. Coast.				del Fuego.			
Sligo (Bay), Ireland -	5 18	11½		Stirling, Firth of Forth,	3 52	7½	4½
Harbour, Ireland	5 23	11½	8½	Scotland.			
Slyne Hd., Ireland, W.C.	4 30	13½	10	Stirrup Cays, Bahamas -	7 0	4	
Smalls Lighthouse, St.	6 0	21		Stockton (Tees), England	4 40	11	
Georges Channel.				Stonefield (Loch Etive),	7 3		
Smerwick, Ireland -	3 50	11½	8	Scotland.			
Smithville, United States	7 19	5½	4½	Stonehaven, Scotland -	1 10	14	11
Smoky Bay, Australia,	12 15	6		Stonington, United States	9 7	3½	3
S. Coast.				Stornoway, Lewis Island,	6 46	13	9½
Smyth Harbour, Tierra	12 0	6½		Scotland.			
del Fuego.				Strangford (Killard Point),	10 53	14	11½
Snape Bridge, Orford,	3 0	6		Ireland.			
England.				Quay - - -	12 31	10½	8½
Socoa, France - -	3 19	12½	8½	Head of Lough	12 44	11½	9½
Society Bay (Sullivan Bay),	0 15	8		(Turley Rocks).			
Yellow Sea.				Streaky Bay (Blanche-	1 0	5	
Socotra Id., Indian Ocean	7 20	8		port), Australia S. C.			
Sofala R., Africa, E. Coast	4 0	19		Stroma, S. side, Pentland	9 47	9	6½
Solovet Road, White Sea	5 0	4		Firth.			
Solway (Tarn Point),	11 22	23	18	Stromness, Orkneys -	9 0	10	7½
Scotland.				Suadiva Atoll, Maldives	1 0	4	
Sosnova Bay, White Sea	2 40	6		Sual Port, Luzon - -		6	
Sosnovets, White Sea -	11 44	18		Suderoe Fiord, Færoe Ids.	6 0	9½	7½
Souma, White Sea -	6 30	5½		Suez Bay (head of Gulf),	2 0	6	
South Farallon, California	10 37	4½	3½	Red Sea.			
South Rock, Ireland	10 58	13	10½	Sughrá, Arabia, S.E. Cst.	8 0	6	
Southampton, England -	10 30	13	9½	Sumburgh Head, Shetland	9 45		
	12 45			Sunday or Raoul Island,	6 0	5	
South West Bay, New	7 30	4		S. Pacific.			
Providence.				Sunderland, England -	3 22	14½	11
—Cape, N. Zealand	12 0	7	5	—N., England -	2 30	15	11½
Southernness, England -	11 20	28		Supé Bay, Peru - -	4 50	3	
Southwold, England -	10 20	6½	4½	Surat, Hindoostan, W. C.	4 0	19	
Spain, Port, Trinidad -	4 30	4	3	Surin, St., France - -	4 11	14½	11
Spensers Anchorage, Bay	11 42	39	33	Surinam, Guayana -	6 0	5½	
of Fundy.				Sussex Port, Falkland Ids.	8 15	6	
—Bay, Africa, S.W.	10 50	5-6		Sutton Pool, England -	5 32	15½	11½
Coast.				Sviatoi Nos, Lapland -	9 15	14	
Spenser Gulf, (Thorny	12 0	6-8		Svineoe Fiord, Færoe Ids.	12 0	6½	4½
Passage,) Australia, S.				Swain Reefs, Australia E.	10 25	10	
Coast.				Coast.			
—Point Lowly -	7 0	6-8		Swan Id., Bass Strait -	9 35	6	
—Port Augusta* -	8 30	9-12		—River, Port Grey,	9 0	1-1½	
—Point Riley -	5 45	4½		Australia, W Coast.			
—Wallaroo - -	irr.	4-5		Swansea, (Mumbles	6 1	27½	20½
Spicers Cove, B. of Fundy	11 35	37	30½	Lighthouse), Wales.			
Spider Id., China, E. C. -	10 0	17		Swift Bay, Australia, N.	12 0	21	
Spitzbergen (Bell Sound)	8 56	3½		Coast.			
Spurn Pt. (Humber R.),	5 26	18½	15	Swona, E. side, Pentland	10 24	10	7½
England.				Firth.			
Staten Island, Tierra del	4 30	8		—W. side, Pentland	9 35	10	7
Fuego.				Firth.			
Staunton Id., Yellow Sea	1 30	8	5½	Sydney, Australia, E. Cst.	8 38	4½	4

\* At Port Augusta, when the winds veers round to West and South, and blows strong, the rise has been as much as 16 feet. Commander John Hutchison, R.N., Admiralty Survey, South Australia, 1862.

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Harb., Cape Breton	9 0	5	4	Tavoy R., (entrance) Bay	10 30	20	
g ho Yellow Sea -	4 10	10½	8	of Bengal, E. Coast.			
Bay, Africa, W. Cst.	2 40	5		Tay River (Bar), Scot-	2 6	16	14
R., Africa, W. Cst.	4 45	3-4		land.			
Island, S. Pacific		3		Tay-bay-oo-bay, China	10 15	6	
San, River, Pata-	11 45	6		Sea, E. Coast.			
a, W. Coast.				Tebonkos Road, Baly. (N.	5 0	6½	
S. Pacific	noon.	1½		Coast.)			
Persian Gulf -	5 0?			Teelin Harb., Ireland -	5 16	11½	8½
o ho, Yellow Sea -	0 15	6		Tees R. (Bar), England -	3 45	15	
w Ids., China, E. C.	9 0	14		Teignmouth, England -	6 0	13	9½
i Bay, China Sea,	9 30	5½		Tenby, Wales -	6 0	27	20
oast.				Tenerife, Cape Verd Ids.,		8½	6
uano, Chile -	10 14	5		(Santa Cruz).			
Island, Patagonia,	1 3	15½		Terceira, Azores -	12 32	4½	
Coast.				Teriberka R., Lapland -	7 20	12	
g Channel, Canton	1 30	6½		Terschelling (West),	8 40	6	5
r, China.				Netherlands.			
whan Bay, Yel-	10 47	10½	8	Tetrina, White Sea -	3 17	7	
Sea.				Tetuan, Africa, N. Coast	2 23	2½	1½
no Ura Harbour,		6-8	4-6	Texel (outside Shoals),	6 30	4	3½
Id., Japan Sea.				Netherlands.			
ui Harbour, China	11 45	7-12		Thirsty Sound, Australia.	10 45	12-18	
E. Coast.				E. Coast.			
R., George Town,	12 5	10	7½	Thomas St., Id., Africa -	3 25	4½	
nanian.				Thompson Sd., New Zea-	11 30	8	6
R., Launceston,	1 0	12½		land.			
nanian.				Thorny Passage, Spencer	12 0	6-8	
—Port, Magellan	3 5	5		Gulf, Australia, S. C.			
it.				Thorsminde, Jutland -	3 34	2	
ave, Madagascar,	4 18	8		Three Hummock Island	10 30	10	
Coast.				(E. side), Bass Strait.			
Bay, United States	11 21	1½	1½	Three Kings Islands, New	8 0	7	
g, Ki Channel,	6 0	6	5½	Zealand.			
n Sea.				Three Points Cape, Africa.	4 0	4	
g, Summer Islands,	6 37	14	10½	W. Coast			
land.				Three Rivers, River St.	11 30	1	
r, Africa, N. Coast	1 42	8		Lawrence.			
ng Harbour, Mada-	4 30	6		Throgs Point, U. S. -	11 20	9½	7½
ar, E. Coast.				Thurso, Scotland -	8 28	14½	11
g Api, China Sea		7		Ticao Island, (Port San	6 30	6	
g Bolus, Malacca	9 30	10½	8½	Jacinto) Filipinas.			
it.				Tictoc Bay, Patagonia -	1 45	11	
, New Hebrides -	5 35	3		Tien-pak Harb., China,	12 0	8½	
annock, U. States	0 42	2	1½	East Coast.			
nooly Harbour, Su-	6 10	6		Timballier Bay, G. of	irr.	2	
a.				Mexico.			
ski or New Ply-	9 30	12	9	Tinghae, Chusan, China,	11 0	12	9
th, New Zealand.				E. Coast.			
t, Ireland -	4 57	14½	10½	Tobago, Caribbean Sea -	irr.	3½	
Spain -	1 46	6	3½	Tobermory, Isle of Mull	5 36	13	9½
Pt., Solway, Scot-	11 22	23	18	Toboe Ali Point, Banka	8 30PM*	} 12	
				Strait.	10 0AM†		
ilin Cove, United	8 4	2½	2½	Tomo (Seto-uchi), Japan	11 0?		5
ea.				Sea.			
own, United States	9 57	4	3½	Tongatabu, S. Pacific -	6 50	4	
agouche, Nova	10 0	8	5	Tongsang Harb., China,	11 30	12	
ia.				E. Coast.			
ma Bay, Japan Sea	5 50	5		Tonning, Germany -	2 1	9	
ga Harbour, New	7 10	6	4½	Tooniang Id., Bias Bay,	8 0		
and.				China, E. Coast.			

\* In S.E. monsoon.

† In N.W. monsoon.



Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
Topaze Harbour, British Columbia.	b. m. 3 0	ft. 16	ft. 11½	Turon B., Cochin China	b. m. 3 0	ft. 4	ft.
Torbay, England - -	6 0	13½	10	Tuticorin Harb., G. of Manar, Bay of Bengal, W. Coast.	1 15	2½	1½
Toro Point, Chile - -	9 45			Tutukaka Harbour New Zealand.	7 0	9	7
Tortola, Virgin Islands -	8 30	1½		Tweed River (Danger Point), Australia E.C.	9 45	5-8	
Tortugas, Florida, U. S.	9 56	1½	1	Twofold B., Australia, E.C.	10 0	7	5
Towan Id., China, E. C.	9 20	13		Tylatiap Harb. Java, S.C.	8 45	3½	
Tower Id., Galapagos -	?	?		Tynemouth (Bar), England	3 20	14½	11
Townshend Harb., Tierra del Fuego.	2 30	5		Typa Anchorage, China, E. Coast.	10 0	7	
Townshend Port, Oregon	3 49	5½	5	Uist North (Kallin), Scotland, W. Coast.	5 59	13½	9½
Tracadie, Prince Edward Island.	7 0	3½	2	— (Vallay), Scotland, W. Coast.	6 10	11½	8½
Tracey Harbour, British Columbia.	12 0	16	11½	— South. (Loch Boisdale), Scotland W. C.	5 47	12½	9½
Tracy Island, Korea, S. Coast.	8 58	11½	8½	Ullapool, Loch Broom, Scotland.	6 40	14½	10½
Træ Islands, Norway -	11 45	7		Ummen Nakheilab, Persian Gulf.	7 30?	8?	
Trawbreaga Lough, Ireland.	6 10	11½	8½	Underwood Port, New Zealand.	6 10	8	6
Tréguier, France - -	5 32	25	18½	Union Bay, La Plata -	3 10	12	9
Trek Island, White Sea -	10 48	20		Union, Port la, G. of Fonseca, Cent. America.	3 15	10½	8½
Trepassey, Newfoundland	7 0	6½	5	Unsang, Borneo -	8 0	3½	
Tréport, France - -	11 9	27	21	Upemvik, Greenland -	11 0	8	
Tres Cruces Point, Patagonia, W. Coast.	1 15	16		Upstart Bay, Australia, E. Coast.	9 0	6	
Triangles, Gulf of Mexico		1½		Urakami, Japan Sea -	7 30	6	5
Trincomalie Har., Ceylon, S. Coast.	8 18	2	1½	Uranouchi, Japan Sea -			5
Tringano R., G. of Siam, China Sea, W. Coast.	8 0	7		Urie Firth, Shetlands -	9 45	6½	5
Trinidad (Port Spain), Caribbee Islands.	4 30	4	3	Ursula Id., Palawan, China Sea, E. Coast.	11 0	7½	
Trinity Bay (Bull Id.) Newfoundland.	7 22	3½	2	Ushant, France - -	3 32	19½	13½
— Opening, Great Barrier Reefs.	9 15	7-12		Ushruifi Islands, Red Sea	6 14	2	
Tristan d'Acunha, South Atlantic.		8		Utria, New Granada -	4 0	12	
Triton Harb., Newfoundland.	7 0?	2-4?		Værø, Norway - -	12 0	9	7½
Tromsø, Norway - -	1 45	8		Valdivia Port, Chile -	10 35	5	
Troon, Scotland - -	11 50	10	7½	Valentia Harb., Ireland -	3 42	11	8
Troubridge Shoals, Australia S. Coast.	3 30	6		Valentine Harb., Magellan Strait.	2 0		
Truro, England (Town Quay).	5 5	10	6	Valery St. en-Caux, France	10 46	27	21½
Tsang-chow Id., Bias Bay, China, E. Coast.	8 30			— sur-Somme, France.	11 46	27	21½
Tsau-liang-hai or Chosan Harb., Japan Sea.	7 45	7	5	Vallay, North Uist, Scotland, W. Coast.	6 10	11½	8½
Tsu-sima Sound, Japan Sea.	8 30	8	6	Vallenar R., Patagonia, W. Coast.	0 18	5	
Tsugar Strait, Japan Sea	5 0	5		Valparaiso, Chile -	9 32	5	
Tudwall, St., Road, Wales	7 45	14		Vansittarts Saddle, Yellow Sea.	4 20	10	8½
Tumaco Road, Ecuador -	2 33	12		Vao Port, Isle of Pines, New Caledonia.	8 6	4	
Tunis, Mediterranean -		3		Veere, Netherlands -	1 20	15	
Turna Bay, White Sea -	9 54	11		Ventry, Ireland -	3 44	10½	7½
Turner C., Prince Edwd. Island.	6 10	4	2	Venus Harbour, Australia, S. Coast.	2 15	6	

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.			Springs.	Neaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Vera Cruz, G. of Mexico		2		Wangari Harbour, New Zealand.	7 0	9	7
Vermilion Bay, G. of Mexico.	irr.	2½	1½	Wangaroa Harbour, New Zealand.	8 15	7	
Vernon Chan. (Chusan Arch), China, E. Coast	9 40	14		Wangaruru Harbour, New Zealand.	7 10	9	7
Versavah, Hindoostan, W. Coast.	12 15	16		Wapitagn Harb., G. of St. Lawrence.	10 30	5	3
Verte Bay, Nova Scotia	10 0	9	5	Warleigh Quay, River Tavy, England.	5 47	14½	10½
Victoria Port, Brazil - St. Juan de Fuca Strait.	3 0 irr.	4 7-10	5-8	Warnboro' Sd., Australia, W. Coast.		3-4	
Victoria R., Mosquito Flat, Australia, N.W. Coast.	12 19	15-24		Warrenpoint, Carlingford, Ireland.	11 10	14½	12
— Sandy Island, Australia, N.W. Coast.	1 17	3-10		— Lough Foyle, Ireland.	6 20	6½	5
— Turtle Pt., Australia, N.W. Coast.	7 15	7-13		Warsheek Roads, Africa, E. Coast.	4 30	8	
Vigo, Spain -	3 0	12-13		Watch Hill, United States	9 0	3	2½
Vila Harb., Sandwich Id., Banks Ids.	5 0	5		Waterford (Bridge), Ireland.	6 6	13½	10½
Vin Harbour, G. St. Lawrence.	5 45	5	3	Waterford (Duncannon Fort).	5 20	12½	10
Vincent, St., Cape, Madagascar, W. Coast.	4 45	12		Waterloo B., Africa, S. Cst.	4 0	6	
— Port St., New Caledonia.	5 50	4½		Week Islands, Tierra del Fuego.	2 0	5	
Virgin C., Magellan Strait.	8 30	36-42		Wei-hai-wei Harbour, Yellow Sea.	9 30	9	
Vivero, Spain, N. Coast -	3 0	15		Weir Head, R. Tamar, England.	6 17	5½	1½
Vladimir, St., Bay, G. of Tartary.	irr.	2		Welcome B., Patagonia, W. Coast.	0 50	7½	
Volcano Ids., China, E. Coast.	11 30	15	7½	Wellesley Is., Australia, N. Coast.	7 30	8-12	
Voronov C., White Sea -	11 20	17		Wellfleet, United States	11 5	13½	12
Waagoe Fiord, Færoe Ids.	6 0	9½	7½	Wells, England -	7 0	12	
Waddington Harb., Bute Inlet, B. Columbia.	6 0	13		— Bar, England -	6 20	18	
Wahaay Harb. (Ceram), N. Coast, Moluccas.	6 0	3		Wenman Isles, Galapagos	2 10		
Waikato R., New Zealand.	9 30	12	9	Weser (outer light vessel), Germany.	11 30		
Walker Creek, Choiseul Id., Falkland Ids.	6 20	5½		West Cove, Kenmare R., Ireland.	3 52	10	7½
—, R. Tyne, England.		10½		— Gat, Netherlands -	1 45	7	
Wallace Har., Nova Scotia	10 30	8	5	— Hill, Australia, E. C.	10 20	24	
Wallis Id., Torres Strait	irr.	7		West Quoddy, B. of Fundy	11 12,	21	17
Walvisch Bay, Africa, W. Coast.	1 54	6		West River, China, E. Coast, see Si Kiang.			
Wanchu R. (entrance), China, E. Coast.	9 0	15½		Western Port, Australia, S. Coast.	1 10	8	6
— (City), China, E. Coast.	9 30	15½		Westmanshaven, Færoe Ids.	8 0	9½	7½
Wang-kia Bay, Yellow S.	2 30	9	7	Westness, Orkneys -	9 11	10	7½
Wang-kia-tia Bay, Yellow Sea.	6 0	12	9	Weston-super-mare, England.	6 54	37	28½
Wanganui R., New Zealand.	10 15	8	6	Westport, Ireland -	4 57	12½	9½
— Inlet, New Zealand.	11 20	7	6	Wexford, Ireland -	7 21	5	3½
				Whampoa { In March -	1 40		
				(Docks), { In April -	1 15		
				China { In May & June	0 30		
				See foot note, p. 169.			

Place.	High Water, Full and Change.	Rise.		Place.	High Water, Full and Change.	Rise.	
		Springs.	Noaps.			Springs.	Noaps.
	h. m.	ft.	ft.		h. m.	ft.	ft.
Whitby, England	3 45	15	11½	Wusung River (entrance), Yang-tse-Kiang, China, E. Coast.	0 30	15	10½
White Dog Ids., China, E.C.	9 0	18		— (Pheasant Point)	0 35	13	5
Whitehaven, England	11 14	23½	18½	Wynkoops Bay, Java	3 0	4½	4
— Nova Scotia	8 0	6½	4½	Yang ho, Yellow Sea	0 15	6	
Wick, Scotland	11 22	10	7½	Yang-tse Kiang (entrance), China, E. Coast.	12 0	25	10
Wicklow, Ireland	10 29	9	6½	Yarmouth Haven (Brush) England.		5½	4½
Wide Bay, Australia, E. C.	9 14	10	7	— Bay of Fundy	10 9	16	13
Widewall, Orkneys	9 3	10	7½	— Bridge, England		5	4
Wigton, Scotland	11 30			— Road, England	9 15	6	4
William Pt., Falkland Ids.	5 15	7	5½	— Isle of Wight, England.	10 0	7	6½
— New Zealand	12 45	8	6	Yealm River, Bigbury Bay, England.	5 37	16½	11½
— Scotland, W.C.	11 10	18	10	Yedo Bay, (Yoku-hama) Japan.	6 0	6½	4½
Willis Islets, Australia, E. Coast.	8 0	6		Yellaboi, Africa, West Coast.	7 10	10	
Willoughby Cape, Kangaroo Id., Australia.	4 10	6		Yeu, Ile d', France	3 6	14½	10
Wilmington, United States	9 6	3	2½	Ylo Road, Peru	8 15	6	
Wilson Promontory, Australia, S. Coast.	2 0	10		Yndependencia B., Peru	4 50	4	
Winter Harb., Melville Id.	1 30	3½		Yoku-hama, Yedo Bay, Japan Sea.	6 0	6½	4½
Winterton Ridge, England	7 50			York C., Australia, East Coast.	11 15	10	7
Wisbeach, England	7 30	15		— Factory, Hudson Bay	11 15	10-14	
Wisbeach Eye, England		20		— River (Moody's Wharf), United States.	9 35	3½	
Wivenhoe, Colne River, England.	12 10	15	10	— Road, Magellan St.	2 0	9	
Wolstenholm Sound, Arctic Regions.	11 8	7½		Youghal, Ireland	5 14	12½	10
Woodbridge Haven (Bar), England.	11 45	12	9	Yung R., Chinhae, China, E. Coast.	11 20	12½	
— (Kingston Quay), England.	0 35	10		— Ning-po-fu, China, E. Coast.	1 0	9	
Woodbridge, (Wilford Bridge), England.	0 55	7		Yung-hing Bay, Japan S.	5 20	2½	
Woodlark Id., Louisiade Archip.	7 15	4		Yura Harbour, Japan Sea	6 5	6½	
Woods Hole (entrance from Vineyard Sound), United States.	8 34	2	1½	Zambezi River (Pearl Id.), Africa, E. Coast.	4 30	12-15	
— (entrance from Buzzard Bay), United States.	7 59	4½	4	Zanzibar, Africa, E.C.	5 20	10	
Woolwich, England	1 37	18½	15½	— (Channel) Africa, E. Coast.	4 15	11	
Workington, England	11 4	20	15	Zaudzi, Mayotta, Comoro Ids.	4 10	12	
Wrabness, Stour River, England.	12 29	12		Zebu Port, Filipinas	12 0	7	
Wranger Oog, Germany	12 0	9?		Zeyla, Africa, E. Coast.	7 15	8½	
Wrath Cape, Scotland	7 30	15½		Zieriksee, Netherlands	2 0	11	9
Wreck Reef, (Bird Islet) Australia, E. Coast.	8 3	6					
Wuchu, Si Kiang, China, East Coast.		1-1½					



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